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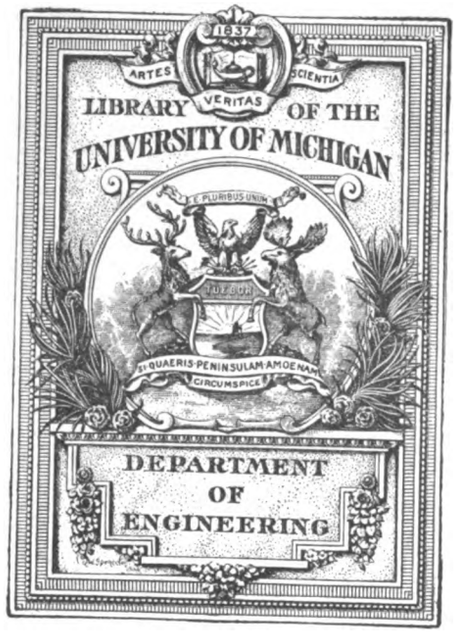

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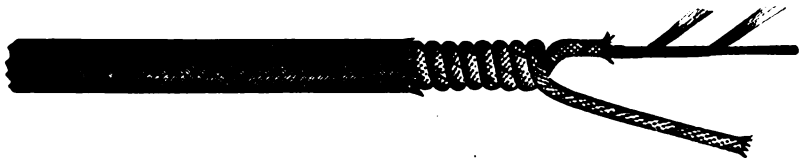
THE CORD THAT LASTS.



This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

"EACO" STEEL SWITCHBOARD CORD

will outlast anything on the market. Write and get prices, and when doing so state what make of switchboard you are using.

ELECTRIC APPLIANCE COMPANY, Telephone Manufacturers, *CHICAGO SAN FRANCISCO*

SPECIFY

The "Chloride Accumulator"

IT IS STANDARD WITH THE OPERATING COMPANIES AND THE LARGEST MANUFACTURING COMPANIES

THE ELECTRIC STORAGE BATTERY CO.

Philadelphia, Pa.

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QUALITY IS OUR POLICY — MAKERS of TELEPHONES — EVERYTHING ELECTRICAL

Telephones vs. Prices

Do not ask us to meet the prices of cheap competition. The value of WESCO Telephones will not permit it.

We are in the telephone business on a quality basis, that's the only kind of telephone we can afford to sell, and it is the only kind you can afford to buy.

Measured by the actual returns on the investment, WESCO Telephones are the cheapest telephones made.

SEND FOR BULLETIN NO. 66 AND DISCOUNTS.

WESCO **THE WESCO SUPPLY CO.** WESCO

FT. WORTH, TEX. ST. LOUIS MO.

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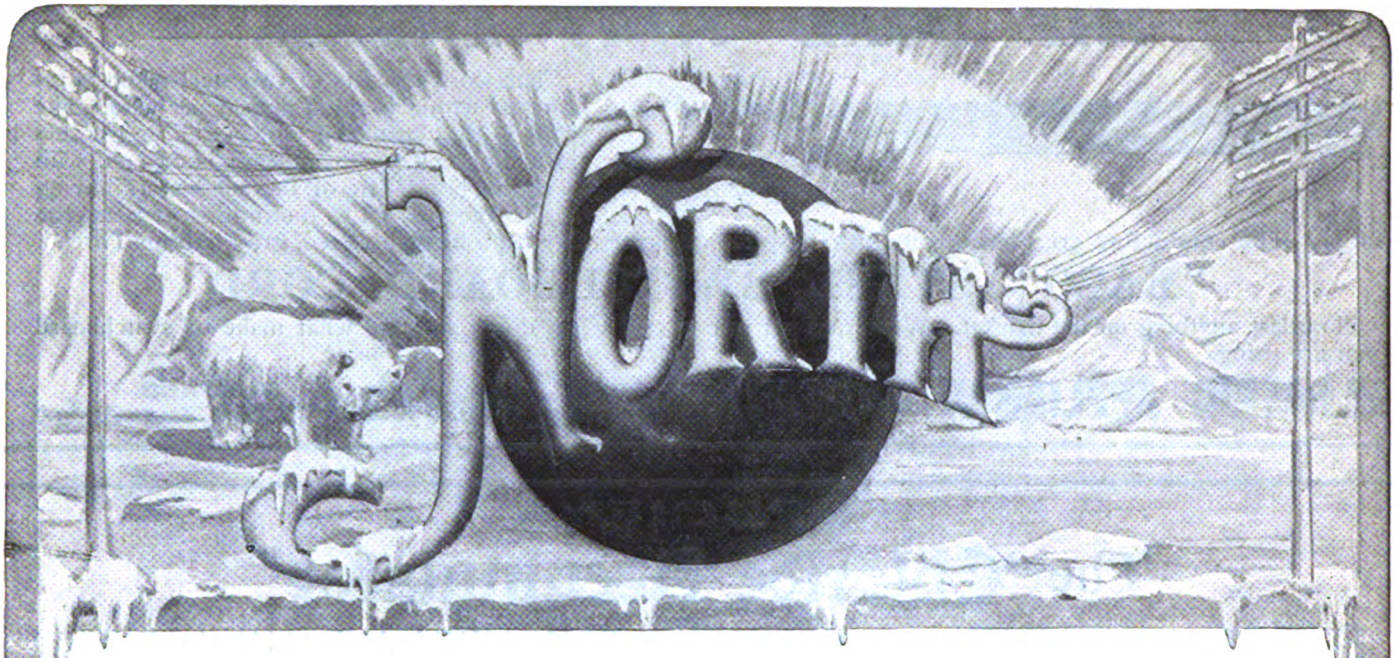

ABOUT BRASS

Most mechanical parts of telephone apparatus are made in punch presses and lathes rather than by casting as in former years. This permits using automatic machinery and a higher grade metal—a cheaper, more accurate and serviceable product.

There are two compositions of brass used. Switchboard plugs and posts are turned from rods in automatic screw machines; transmitter backs, generator frames and gear wheels, switchhooks and so forth, are formed from sheets in punch presses. Turning brass, per 100 pounds, is 66 pounds 10⅔ ounces copper, 31 pounds 5⅓ ounces zinc and two pounds lead—the lead is added for free cutting quality; stamping brass is 66 pounds 10⅔ ounces copper and 33 pounds 5⅓ ounces zinc.

In making brass the copper is first melted in crucibles and the other metals added afterwards; for the temperature required to melt copper would burn the zinc or lead. It is then cast into bars and formed cold in sheets or rods by a succession of rolls, gradually reducing it to the desired gauge. For turning brass the bars are first rolled to within an eighth or quarter of an inch of their final size and latterly reduced by drawing through dies—not cut, for the metal is forced back upon itself, thus forming a rod of greater length. In the reduction of metal 7 or 9 gauges, it is necessary, during the process, to soften it by heating and plunging in water; for the roll pressure tempers or hardens it. (Brass or copper hardens by being allowed to cool slowly, while steel is softened by the same process.)

The brass stock is tested and analyzed before it is used; for it must be universally accurate in gauge and composition to admit of the free action of the machines.

All "NORTH" punching brass stock is of a heavier gauge than usual—it gives the parts that solidity and wearing quality found only in "NORTH'S" apparatus.

CHICAGO **CLEVELAND** **DALLAS**

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO

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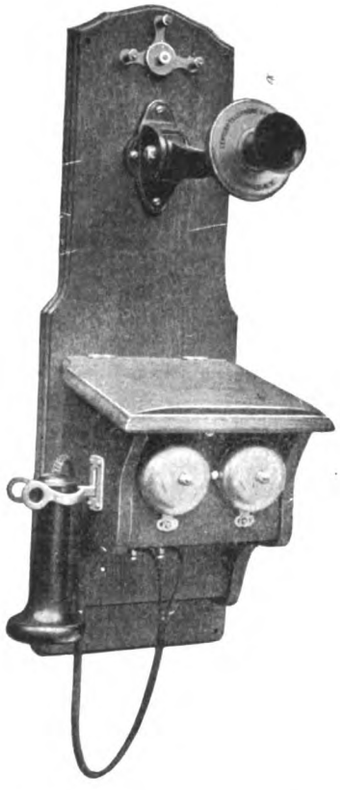
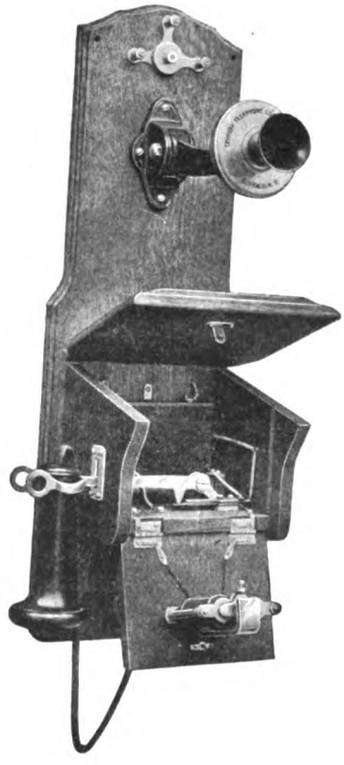
CENTURY
100 % GOOD

IN COMMON BATTERY TELEPHONE SERVICE





it is absolutely necessary that the telephones are perfect, electrically and mechanically.

We manufacture wall and desk telephones for this class of service. During the past five years these telephones have proven to be the most efficient and reliable made.

Our No. 70 wall telephone is so constructed that all parts are easily accessible.

The cabinet, made of quartered oak, is small and well proportioned.

The telephone is equipped with our No. 5 Platinum Electrode Transmitter and No. 11 Perfection Receiver.

A trial of this instrument will convince you of its efficiency and reliability, and if interested we will be pleased to send you one or two of these instruments on 60 days' trial, charges prepaid.

CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

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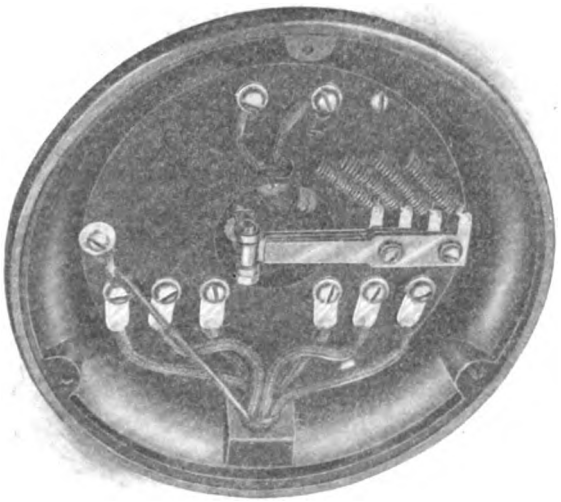
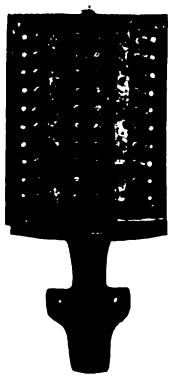
MONARCH APPARATUS

THE DESK SET



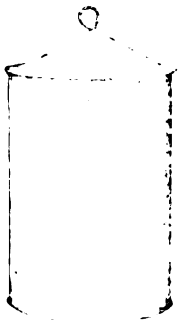
All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 1016 SOUTH CLINTON STREET CHICAGO, ILL.



SIDE BRACKET.

Patented



TYPE A—10-Pair Hall Cable Box.

Do You Use Cable?

If you do, you know its advantages. If you don't you should get acquainted with it. But cable distribution requires the use of terminal boxes. In the selection of the right one you may err, therefore it is best to buy the one that has the greatest amount of merit. That one is the HALL. It was designed by a man who is an expert in cable construction. There being none on the market that suited his ideas, he set about inventing one, and he invented a good one. So good, in fact, that those companies which have tried it would as soon install bean sticks for their pole lines as to use any other cable terminal. That's a pretty strong comparison, but we know it is right, and so will you if you only write us for a trial order.

THE MOUNTAIN STATE ELECTRICAL COMPANY

Sole Manufacturers WHEELING, WEST VIRGINIA

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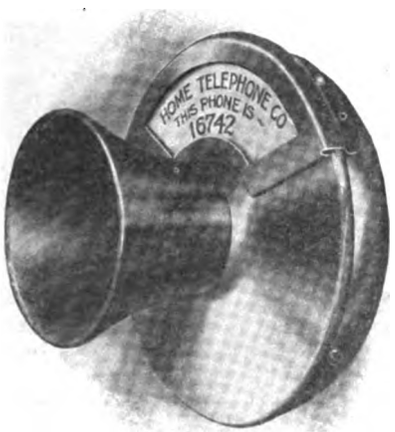
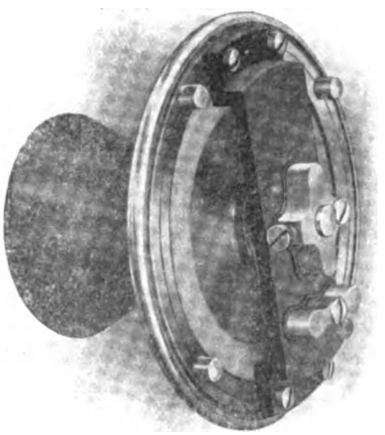
DEAN TELEPHONE APPARATUS

Dean Transmitters.



Front View Showing Card Holder.



Back View Showing Cover Removed.

Our transmitters have from the first set a new standard of excellence, not only in point of transmission, but in careful design and construction.

They have furthermore stood up under the most exacting service, where other makes of instruments have utterly failed.

The direct acting principle on which they work produces the best possible results. It is an actual mechanical motion, not hidden theory.

We now house our transmitters in a new case, made from rigid drawn brass, thus doing away with the uncertainty of a casting. This new front, is, of course, interchangeable with all other parts of our first transmitters.

All of our telephones, both magneto and common battery, are fitted with these transmitters—the soul of the instrument.

This is one of the reasons why our telephones have active life.

The construction and high grade material used insures long life.

These statements are backed by our guarantee.

We can make prompt deliveries on all regular telephones.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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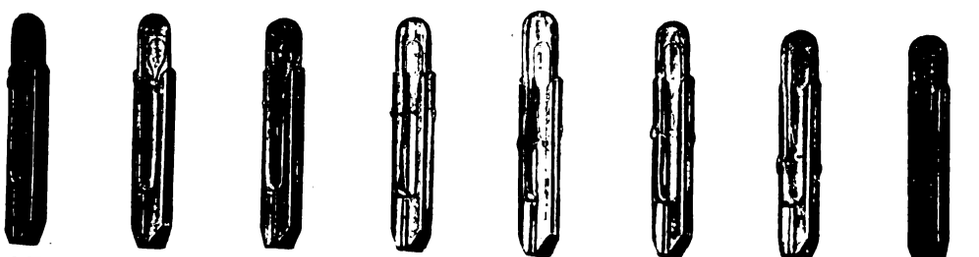
WE ARE NOT IN THE TRUST

KELLOGG
MINIATURE LAMPS

FOR TELEPHONE SWITCHBOARDS, ETC.



4-V .2-Amp. | 4-V .4-Amp. | 10-V .1-Amp. | 16-V .1-Amp. | 20-V .1-Amp. | 24-V .075-Amp. | 40-V .085-Amp. | 48-V .075-Amp.

ADVANTAGES

1.—**OUR TIPLESS LAMPS ARE UNEQUALED.** The lamps are rounded off on the front end, thereby forming a small but effective convex lens which focuses all the light rays into the most desirable position.

2.—**THE EFFECTIVE CANDLE POWER IS THE MAXIMUM.** This is due to the lens effect and the high electrical efficiency.

3.—**THE FILAMENT IS VERY DURABLE.** They are manufactured by our special process, which produces exceptionally strong, uniform, and long lived carbon.

4.—**CHEMICALLY PURE PLATINUM IS USED WHERE THE CURRENT IS CARRIED THROUGH THE GLASS.**

5.—**THE LAMPS HAVE THE HIGHEST VACUUM OBTAINABLE.** This gives long life and greatly reduces the conduction of heat from the filament to the jack.

6.—**EACH LAMP IS GIVEN A CAREFUL INDIVIDUAL TEST FOR VOLTAGE, CANDLE POWER, MECHANICAL PERFECTION AND SIZE.**

TABLE OF VOLTAGES.

Voltage.	Approximate Candle Power.	Amperes.
3	.2	.2
4	.2	.2
4	.2	.4
5	.2	.15
6	.2	.15
10	.2	.1
12	.2	.1
14	.2	.1
16	.2	.1
20	.3	.1
24	.3	.075
30	.3	.085
40	.5	.085
48	.6	.075

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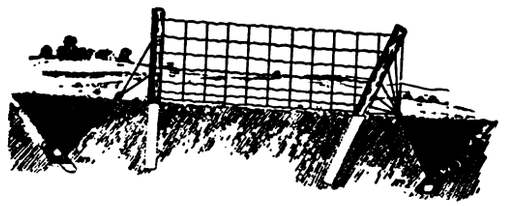

"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

"HERCULES" Anchors will not creep.

Send for Prices and Circulars

The W. G. Nagel Electric Co.

28-32 ST. CLAIR ST. TOLEDO, O.

Are You Satisfied

with the manner in which your telephone system is operating?

Do your subscribers become displeased and out of patience with your line and the management of it because of the "listening in" of others?

Must their messages be delayed because of the carelessness of others in leaving their receivers off the hook "cutting out" the rest of the line?

Now Mr. Manager-of-the-telephone-company it's clearly up to you to eliminate these faults and (incidentally) improve the efficiency of your line 100 per cent. by installing condensers of approved design and recognized merit.

Such condensers are the product of our factory and are called

ANDRAE CONDENSERS

They are well known for their effectiveness and durability, but if you are in any way undecided as to their value we will equip an entire line on trial and pay return charges if unsatisfactory.

We manufacture three distinct telephone condensers and consider them the best.

They are the "Standard," Type XX, which is made to withstand 300 volts, alternating current, indefinitely and comes in various capacities from 1-4 M.F. to 3 M.F.

The "Special" No. 225, actual size 2 11-16 x 1 1-2 inches, terminals included, is easily installed in any bridging magneto box and recommended for use on 'phones already in operation.

Telephone Condenser No. 186 is our new form of condenser fitted in a handsome, quarter-sawed oak case. Easy to install because of its simple, compact form.

Andrae Telephones Never Disappoint

We manufacture telephones and telephone accessories. None better.

WRITE FOR CATALOG NO. 11, which tells all about our products.

JULIUS ANDRAE & SONS COMPANY

99 West Water Street MILWAUKEE, WIS.

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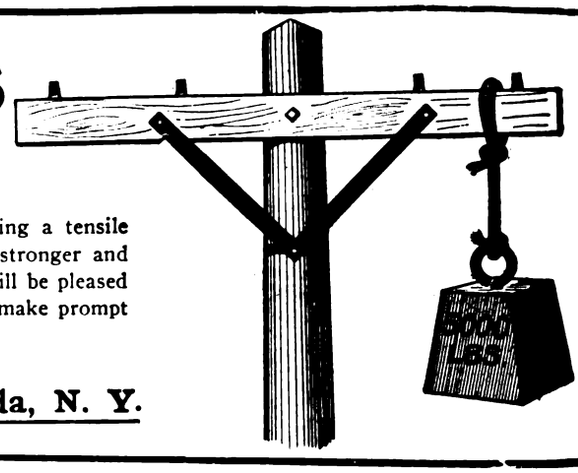
CROSS ARM BRACES

PLAIN AND GALVANIZED



Our braces are made from best quality Bessemer steel, showing a tensile strength twice that of soft steel or iron, thereby securing a much stronger and better brace at no additional cost. Send us your inquiries and we will be pleased to quote best prices, either plain or galvanized. Are in position to make prompt deliveries.

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Can You Stop Her?

We Can

Because We KNOW HOW

Our Booklet Will Teach YOU How

It is Yours for the Asking

Don't be Afraid to Ask, and "Be Shown"

Others Have Made Money by Asking—So Can You

Everything We Make Makes Money

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THE STANDARD "HEMINGRAY"

All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.

Established 1848

CHEAP VS. EFFICIENT SERVICE

The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit

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FOR

Aerial, Underground, Switchboard

THE FAMOUS GREEN AND BLACK DUPLEX FOR INTERIOR WORK.

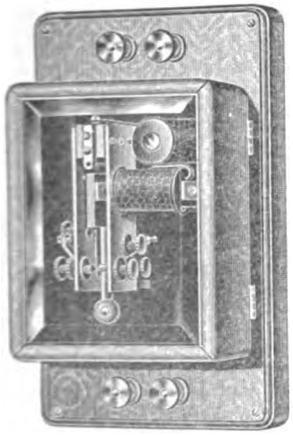
DUPLEX AND TRIPLEX FOR ALL PURPOSES.

THE F. BISSELL COMPANY,
TOLEDO, O.

PRICES AND DELIVERIES TO INTEREST YOU

SIMPLICITY
is the Keynote of Success

A simple device which accomplishes the same results as a more complex one is certainly more preferable. The Sandwich Pole-Changer is the simplest device ever constructed for ringing purposes. There are but three contact springs and as these engage alternately with their opposite sides they cannot be forced out of position by constant use.



It requires no adjustment, as this is done at the factory and is permanent.

The use of a primary constant current battery to operate the vibrator has been dispensed with; a minute quantity of current, hardly a milliampere, being taken from the ringing battery, through suitable resistance coils for this purpose.

It will work in either a vertical or horizontal position, which permits it being hung on a wall or mounted on a cabinet. Another excellent feature is that it is practically noiseless. There are others which are described in our free booklet. Let us send it to you.

THE SANDWICH POLE-CHANGER CO.
400 EDDY STREET, SANDWICH, ILL.

TO YOU, MR. TELEPHONE MAN

In no branch of the electrical field are there better opportunities for technically trained men than in the one devoted to Telephony. The tremendous growth of this business has created a demand for competent men which is much greater than the available supply. Not a week passes, but there appears in the want columns of the electrical journals advertisements for capable men.

ARE YOU COMPETENT TO FILL A BETTER POSITION?

If not, you should not allow a day to pass before you start on the road to improve your knowledge.

The AMERICAN SCHOOL OF CORRESPONDENCE offers you a ready means whereby you can secure the desired technical education which will lift you out of the ordinary rut. You do not have to waste a moment's time away from your present employment. You can be trained by expert instructors in the science of Telephony, and you will receive personal attention the same as if you attended an Engineering School.

The course of study in Telephony embraces every phase of the business from the simplest to the most complex problem. The **why** and **wherefore** of every part in a system of any description is explained in such a thorough manner as to preclude any possibility of doubt as to its usage.

To the young man who wishes to succeed in the telephone field, no better aid could be secured than is furnished by the prescribed studies of the American School of Correspondence.

Think the matter over carefully. If you believe your position could be improved mark X opposite course interested in, fill out and send coupon to us to-day, and we will send full information and 200-page hand book.

Tuition fees are moderate—from $10.00 up—and may be paid in small payments. An inquiry brings information but not an agent to constantly annoy you. We employ no agents. All money paid by the student is used in instructing the student.

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The Switchboard You Should Buy

Because it will enable your present operating force to handle nearly twice as many lines. That's just what our Generator Call Visual Signal Switchboard will do and any of our customers using this type of equipment will gladly tell you so if you care to write them.

The above is one of our standard cabinets with this equipment. It shows how the line signals are mounted, how easily additions can be made or any signal removed if desired.

Rapid in operation, inexpensive to maintain. In fact, the maintenance, compared with the service the board gives, is practically nothing.

Let us make you a proposition on some one of our cabinets with this type of equipment.

We will gladly mail descriptive printed matter free.

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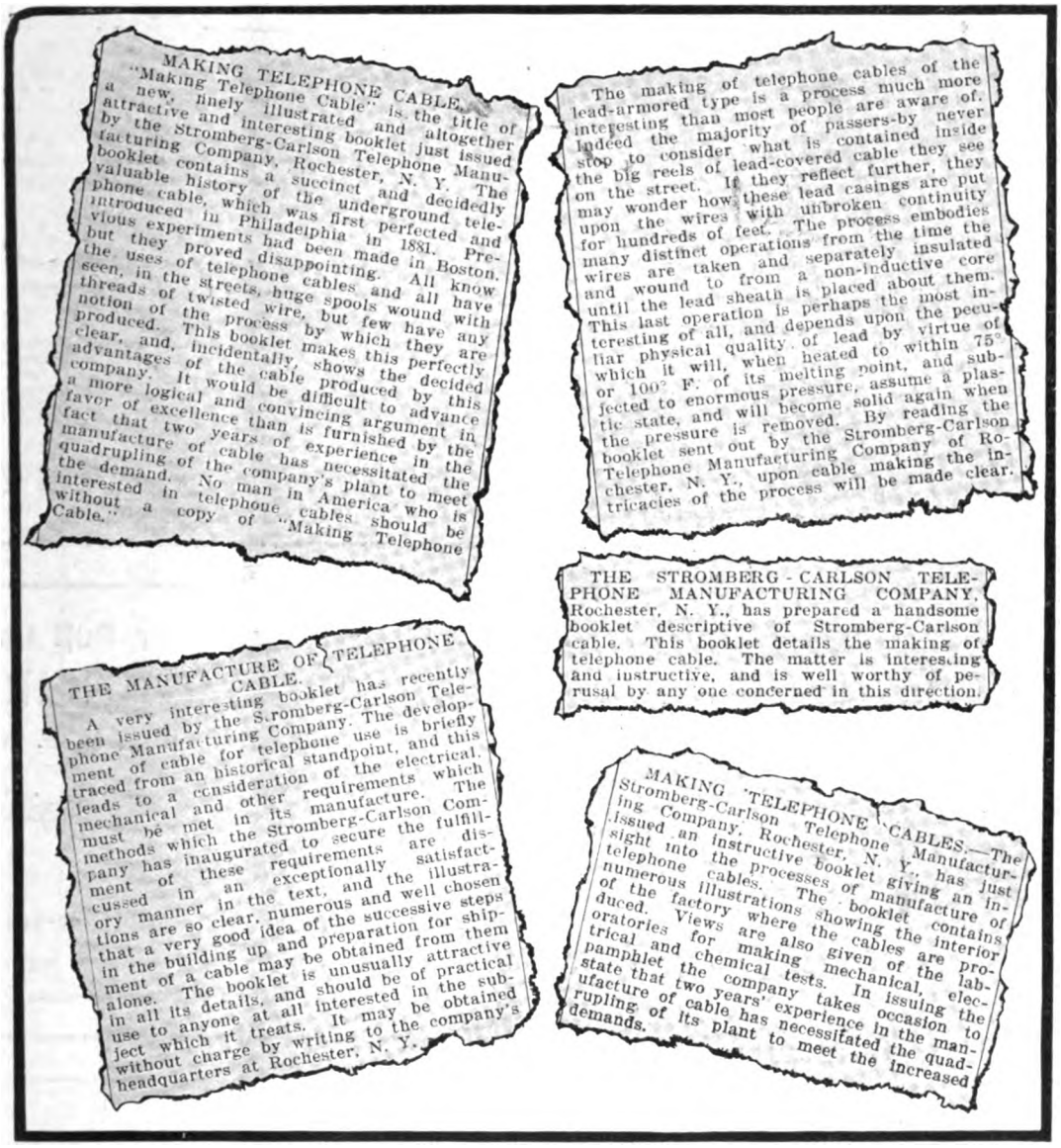

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THE COLUMBUS EVENING DISPATCH. TUESDAY, OCTOBER 24, 1905

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Caleb L. McKee & Co. says—"That the automatic telephone is a success has been demonstrated beyond a doubt, and the favor with which it has been received by the local public is indicated clearly by the upward movement in the securities of the Columbus Citizens' Telephone Co. At the beginning of the installation of the automatic switchboard the common stock was quoted at about 55 bid while at this time 75 is bid with nothing offered below about 85; the preferred has advanced from par to 107 bid with holders asking 111, and it seems likely to reach a much higher level."—Columbus Railway.

Since Oct. 24th these stocks have gone up,— the common to par, the preferred to 113½, and they are scarce at that. Our automatic System did it - can do it for yours. Why do you wait?

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AUTOMATIC ELECTRIC COMPANY
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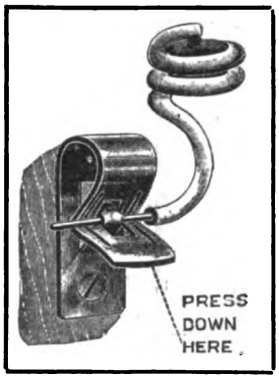
The small amount of time it takes for an inspector's salary to add 25 per cent. to the cost of the dry battery he is inspecting or connecting up.

That is maintenance cost and it ought to be considered as carefully as the first cost. It's just as important.

That is why you should specify



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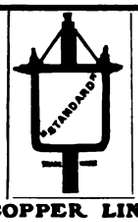

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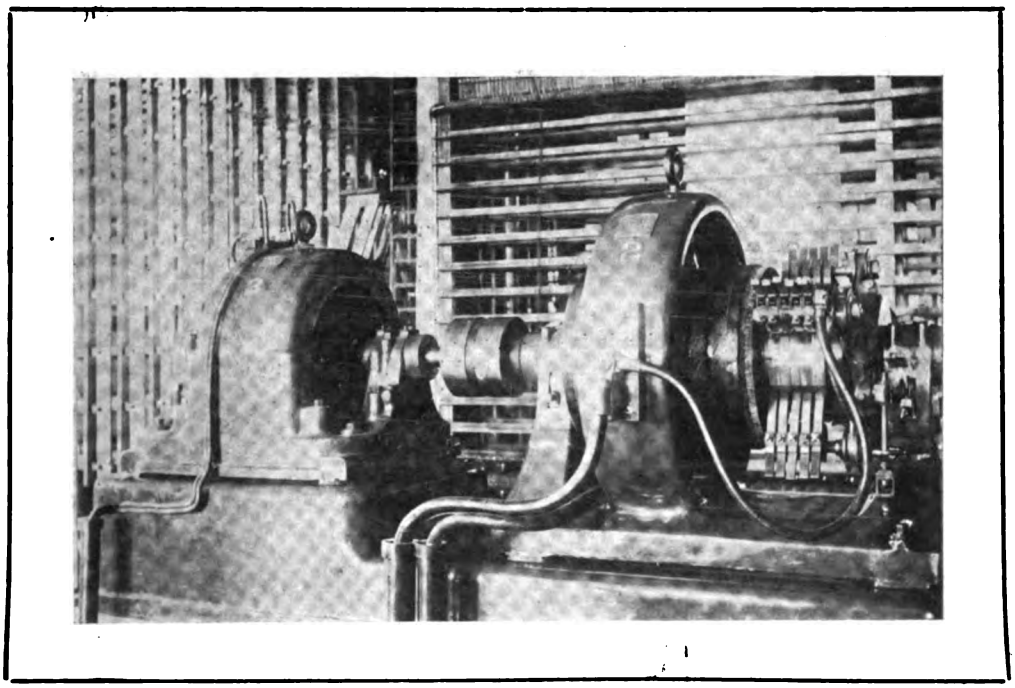
VOLUME XIII *SATURDAY, JANUARY 6, 1906* *NUMBER 1*

Power Installation

By Arnold F. Pierce.

THE purpose of this article is to give a description of the apparatus used, with the method of installing it, in a modern telephone power plant. Owing to the diversity of systems in use, it is practically impossible to give a discussion sufficiently broad to fit all cases, and at the same time so exact as to definitely describe the features of a single plant. The descriptions in this article will therefore refer to the details of an imaginary plant which closely follows the plans laid down by one branch of modern telephone practice.

In central energy systems electric current is supplied to the circuits within the office to actuate signals and furnish battery supply to the operators' transmitters. In addition to this it may be used to operate the motor of the set used to furnish ringing current, and for special interrupted currents for signalling purposes. In some exchanges where ringing current is furnished by a pole changer, the main central office source of energy is used to operate the pole changer vibrator. Current furnished from the central office, passing over the lines and through the instruments at subscribers' stations, is the primary source of the voice currents which cause the reproduction of the words uttered before the transmitter.



Typical Direct Connected Motor Generator Set for Charging Storage Batteries in Telephone Exchange; Generator at the Right.

The necessity for a continuous, steady and reliable source of current for performing the functions above referred to needs no discussion. Such a current is furnished from storage batteries charged by specially designed generators. At times when the batteries are being charged, the current for the operation of the system is furnished directly from the generator. During these periods the battery and exchange load are connected in multiple across the generator terminals. The generator is usually operated by a gas engine, a direct current motor, or an induction motor, according to the source of power available. In the circuit shown in Fig. 1, connections are arranged for the use of an induction motor, operated by a three-phase alternating current. The shafts bearing the armatures of the two machines are coupled together, making a direct-connected pair. The current which causes the rotation of the motor is supplied from the mains of the company which furnishes electricity to consumers throughout the city. It enters the building in the usual manner, and after passing through the switches, meter, fuses, etc., usually installed by the electric light company, is carried to a power protection panel. This panel consists of a base of heavy slate, carrying a main line switch, and protective devices. The panel is set out some little distance from the wall by an iron frame work. The protective features consist of fuses for opening the circuit on the passage of a heavy circuit, due for instance to a short circuit, and of devices for carrying away lightning discharges.

The latter arrangement consists of a spark gap between each wire and ground, with a number of turns of wire forming a reactance coil connected on the machine side of the spark gap, as shown. Any lightning discharge, meeting the high impedence offered by the reactance coils, will be diverted to ground through the spark gap. The apparatus for this spark gap usually takes the form of a metallic globular terminal, about 1¼ inches in diameter, separated by a very slight air-gap from a similar metallic ball, which is thoroughly grounded, and connected by a bus bar to other similar balls on the grounded side of the circuit.

From this panel the power wires are taken through iron conduits to the power switchboard. This is also of slate, and is made in three sections, or panels. In the first is mounted a switch for operating the induction motor for the ringing machine, as well as the switch for starting the motor which drives the dynamo. In circuit with the line connected to the motors is a starting box, designed to introduce resistance and maintain the current at a proper value up to the time the motor attains its full speed, when the full strength of current is thrown on by reversing the switch.

As stated, the motor is directly connected with the generator, and both are mounted upon the same iron base. This rests upon rubber calks, which in turn are set upon a brick foundation built up on the floor of the power room. The bases are held in place by bolts passing through holes in the iron work, and down

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through the rubber calks into the brick pier. These bolts are set into the bricks at the time the foundation is laid, and must be accurately spaced. The rubber calks absorb a great deal of the vibration attendant upon the high speed of the machine.

One of the types of generator usually favored for charging purposes is a shunt-wound, four-pole type, giving a pressure of about thirty volts. These machines are made in various sizes, having current outputs of different quantities, so that a machine may be chosen to carry an exchange load of any estimated dimensions.

The leads from the generator to the power board are conveyed in separate conduits, and with one is also carried the small wire for the generator field rheostat. The leads are of heavy copper wire, stranded, as a rule, to secure greater flexibility. They are attached on the middle panel of the power board to a main-line switch, which opens the circuit to the machine. The field rheostat, connected as shown, is used to vary the output of the generator, in order that current may be supplied to the battery and system at the proper voltage.

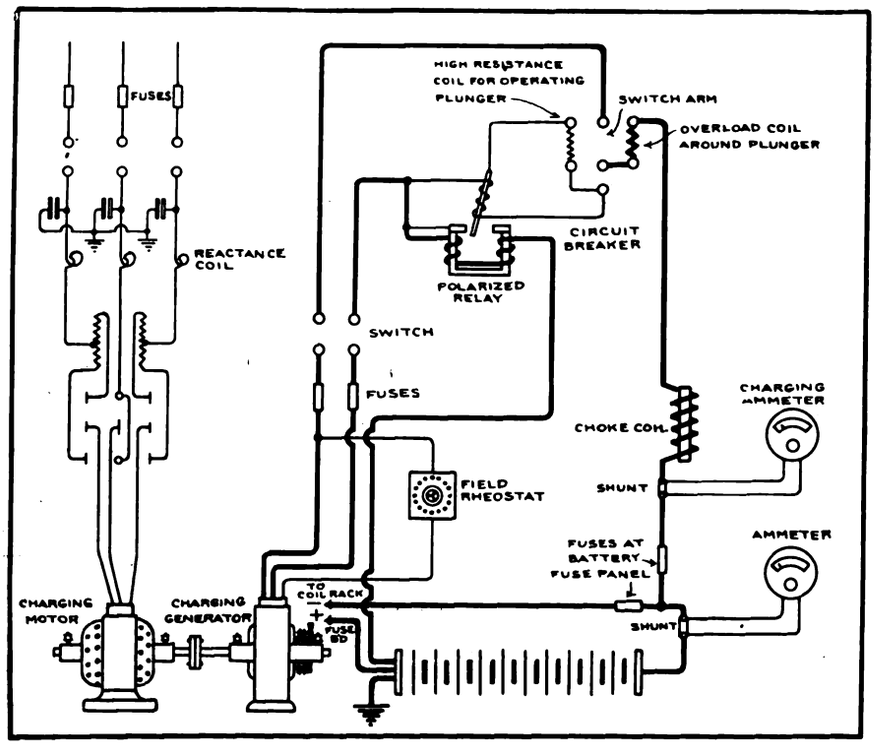

Fig. 1. Charging machine circuit to storage batteries.

From the main switch the positive side of the circuit is carried by bus-bar work through the polarized relay, and thence through the circuit breaker. This device is essential as a protective feature, and many efficient types are offered by the trade. The apparatus is designed for two purposes. The first of these is to open the circuit upon the occurrence of an overload, due to a short circuit or ground.

The opening of the circuit is effected by the drawing up of a plunger mounted in the center of a solenoid. Upon reaching a predetermined height, this plunger trips a retaining mechanism, which, upon being released, allows the main switch bar to fly back under the influence of a spring. The line circuit is broken at carbon switch contacts. It is obvious that by the opening of the circuit at this point the flow of a current sufficiently strong to unduly heat wires through which it passes will be broken before it can raise them to a dangerous temperature.

The second function of this circuit breaker is to open the circuit if at any time the direction of current is reversed. A possible instance of this which may be cited, would occur if for any reason the circuit supplying the motor should be interrupted. This would cause the generator to slow down, until the difference of potential between the brushes, due to the current delivered from the generator armature, would be less than that due to the electro-motive force of the battery. Upon the occurrence of this state of affairs, current for the operation of the exchange would be supplied direct from the battery. In addition to this the direction of current through the polarized relay would be reversed. The pivoted armature of this relay is retained in a magnetically polarized condition by the passage of current through a coil wound in such a manner as to magnetize the core with a polarity which will cause it to be repelled by the left hand contact pole of the field magnet. This current passes from a connection on the positive side of the charging circuit in a coil about the armature core, and thence to the lower contact of the switch bar, which is used to open the negative side of the charging circuit. The attraction of the armature, due to the reversal of current, and consequently of the magnetic polarity, in the field of the polarized relay, closes a circuit through a second, high resistance solenoid on the circuit breaker. This also actuates the plunger, trips the switch, and opens the charging circuit. It also opens the local circuit through the high resistance winding

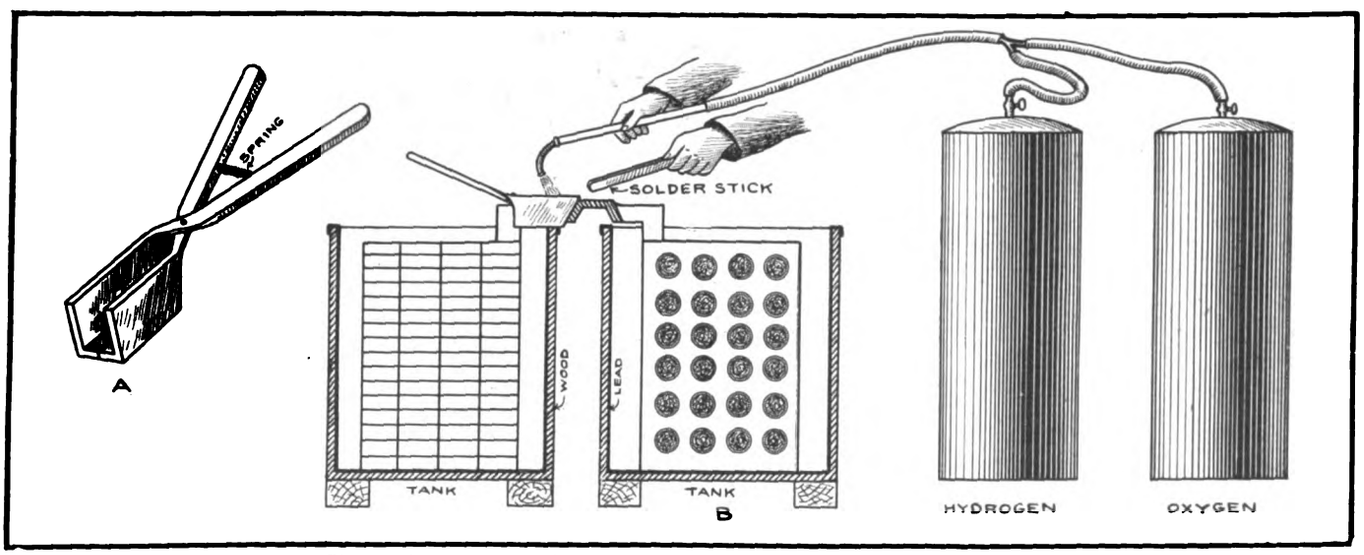

Fig. 2. Arrangement for burning plates of storage battery cells to terminal bar.

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of the circuit breaker, as well as the one through the polarized relay armature winding. These circuit breakers are so designed, that they may be adjusted to release at a predetermined voltage, or load, and are a vital part of the charging circuit.

From the polarized relay the positive wire is usually carried directly to the positive terminal of the storage battery, and is there sweated into a lug provided and burned into the lead terminal bar of the battery. The negative lead runs to a special fuse panel, located near the negative terminal of the battery. This panel carries the main fuses in the charging and discharging circuits, and usually it is also arranged for the insertion of ammeter shunts in the circuit. The ammeter shunts are small bars of copper, having an accurately measured resistance. It is evident that the passage of a given current through this known resistance will produce a definite drop in the voltage between the two terminals of the shunt. The leads to the ammeter, composed of a pair of wires, one of which is attached to each end of the shunt, convey a current due to this difference of potential which is sufficiently great to move the needle of the ammeter. Any variation in the current through the shunt produces a change in the "drop," in potential, which is equal to the product of the resistance of the shunt and the current flowing through it, as expressed by the well-known formula, $E = C \times R$, where E = the difference in potential between terminals of the shunt, R = the resistance of the shunt and C = the current in the main circuit. The consequence is that any variation in the current is measured by the ammeter on the shunt circuit. Although what the instrument really measures is a difference in voltage, as this difference in voltage is proportional to the current, it is an easy matter to arrange the divisions on the scale of the ammeter to show the number of amperes passing through the circuit.

After leaving the circuit breaker, the negative lead is sometimes taken through a retardation or choke coil. This is of wire sufficiently heavy to carry the current, and has a core consisting of fine iron wires. Its object is to smooth out the variations in current, produced in the charging circuit by the dynamo, and, as this has been reduced to a minimum in modern genrators the coil is frequently omitted from the circuit.

The duty and action of the storage battery has been previously referred to, but a few descriptive details may not be out of place. Each cell is made up of three elements, namely, a positive plate, a negative plate, and the acid solution. The positive plate is dark brown in color, as distinguished from the natural

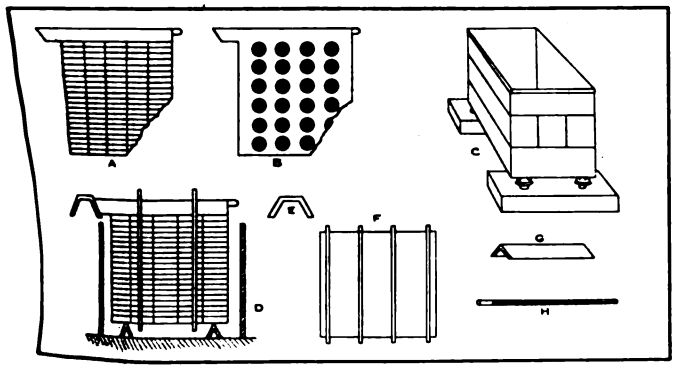

Fig. 3. Details of parts of storage battery cell.

lead color of the negative element. Fig. 3 shows the structure of the plates, or elements of one of the familiar types of cells. "A" is the meshed surface of the negative plate, and "B" shows the disposition of the active element of the positive. In building up the cells the latter is usually the odd number, i. e., there will be twelve negative plates to eleven positive.

In large installations, the containing vessel is usually a lead-lined wooden tank. These tanks are raised from the floor or supported by a glass insulator, somewhat resembling the upper part of a two-piece transposition glass insulator. A little raised button on the top sets into a provided cavity in the base of the tank. Four of these are used to each cell, guarding against electrical leakage. Fig. 3, C, shows a cell so raised from the floor, and Fig. 3, D, shows a cross-section of a cell, showing one plate in position. At the right and left ends of the plates, there are set beneath the projecting lugs, upright, transverse plates of glass, to guard against a possible contact with the lead lining in case of a lug breaking loose from the bus-bars. These are not shown in the illustration. Two glass tubes are placed between each pair of adjacent plates to prevent short circuiting of buckled plates. These are held in place by perforated strips of hard rubber. A recent idea is to do away with the glass tubes and use a sheet of very thin wood between the plates. These are each supported by three slotted cylindrical strips of wood, H, which are set upon the bottom of the tank, between plates. The wood separators are passed through the slots and are thus

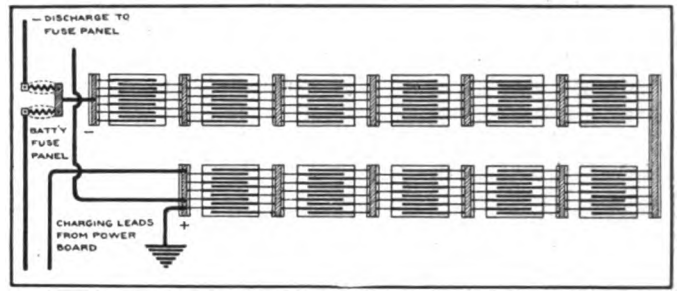

Fig. 4. Layout of storage battery plates and terminals.

retained in position and prevented from warping. This idea has come in general favor with the Bell interests. Below the plates, angular strips of glass similar to that shown at G, Fig. 3, are laid on the floor of the tank to keep the plates from the lining, and to lessen the strain upon the lugs, by which the plates are attached to bus-bars.

In assembling the elements in a cell, the heavy end plates of glass are first set in position at each end of the cell, and the angular strips are laid upon the floor of the tank. The plates are then set down in the cell, their front and back shoulders resting on the vertical glass plates. The positive and negative elements alternate, the lugs of each being at opposite ends. When used the glass tubes are placed between the plates for proper spacing. Beginning at cell No. 1, the plates of the battery are set in order, a string stretched above the battery being used to insure accuracy of line. When a battery of eleven cells is installed, economy of space is usually obtained by setting them in two rows.

When the plates are in position, and in proper alignment, they are ready to be attached to the bus-bars. The terminal bus-bars are solid metal, but are the same outline as the hollow and lighter bars between the individual cells, as shown in Fig. 3, E. Brass or copper lugs are provided on the terminals to provide attachment of the charging leads and ground. In Fig. 4 is shown the general appearance of a storage battery in operation, and the usual arrangement of terminals and plates in a storage battery as set up for operation.

The joining of the plates to the terminal bars is accomplished by "burning" the lead terminals together. A pair of lead burner's tongs (Fig. 2, A) is clamped over the lug of the plate, and close against the beveled face of the bar, as in Fig 2, B. The burning of the lug to the bar can be accomplished by two methods; viz., by using a gasoline blow-pipe flame, or by using the oxy-hydrogen jet, as used in the calcium, or lime light. In the hands of a novice, the former method has the advantage of a less intense heat, and less skill is required, but the work should hardly be attempted by one unfamiliar with lead burning. With the oxy-hydrogen flame, in the hands of a skillful workman, a particularly neat job can be made in much less time than with a blowpipe flame.

The lugs and bus-bar are scraped free of dirt and grease previous to setting them in position, and the flame is played upon them until the surfaces are in a molten state. A bar of hard solder is held in the flame at the same time, and this melts and runs into the metal of the lug, and bus-bar surfaces, and, with the tongs as a mould, forms a perfect union of the two.

(To be continued.)

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Economical Telephone Accounting and Filing Systems

ARTICLE II.—THE GENERAL LEDGER.

*By Charles C. Wilmot, Telephone Accountant.

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CORRECT methods and the proper classification of accounts in the General Ledger provide a reliable foundation upon which to build a successful telephone business. We illustrate four Special Ledger forms, an Index Sheet and two styles of Binders for the handling of these important records. The loose leaf plan offers many advantages over bound books. If it is considered necessary, binders can be provided with special locks and keys to prevent the removal of any account by unauthorized persons.

Form No. 2 is designed to care for all accounts not specially provided for in the other forms. By writing in words "Debit" or "Credit" at head of columns, sections can be used for one, two or three debits to one credit column, or the reverse, as may be desired. A careful study of the printed headings of Forms No. 3, 4 and 5 will make their practical use self explanatory.

The following plan will present a basis for the separation of accounts, which can of course be modified to suit the size and needs of different exchanges and large systems. It is founded upon a classification of accounts into six main divisions as follows: Investment and construction accounts; accounts receivable; operating; maintenance; general accounts, and accounts payable, or liability accounts.

Under the first of these divisions should be placed all figures relating to the following items: Plant and equipment; real estate and buildings; underground construction; aerial construction; tools and machinery; material store room; office furniture and fixtures; toll lines. These are to be arranged in alphabetical order on form No. 3; items relating to local and branch exchanges should go on forms Nos. 4 and 5, being arranged in alphabetical order with necessary index sheets to afford means for easy and rapid reference. The figures at the heads of columns, in these forms, can be used in making distribution on expense vouchers, voucher checks, etc., instead of writing out the words, "construction, reconstruction," etc., and thus save a considerable amount of time.

It will be noticed that the cost of all material used for construction, reconstruction and maintenance is kept separate from labor charges and other expenses, thus giving a check on material used for any period.

Under the heading "Accounts receivable" come bank accounts; petty cash; personal accounts for cash; advances to foremen, construction men, branch exchange managers, etc.; accounts for material sold other companies, etc.

For the local exchange rentals and tolls, the totals, shown on form No. 4, give the amount of unpaid outstanding accounts in subscribers' ledgers. Branch exchanges' rentals and tolls for amounts outstanding in outside branch exchange ledgers are also provided for. A suspense account shows in totals the amount of inactive or doubtful accounts closed off to an auxiliary ledger, when telephones are removed, for each current month. In a division for outside toll accounts receivable are shown, in totals, the amounts outstanding for uncollected tolls at exchanges or toll stations not shown in above accounts.

The class of accounts embraced in the main division for "operating expenses" is provided for on the last section of form No. 5 for exchanges, and for toll lines on form No. 3, in the debit column of the toll line earnings section.

Maintenance accounts are provided for on forms Nos. 3 and 5. The costs of material used are to be kept separate from the labor and other expense. A reconstruction account is provided

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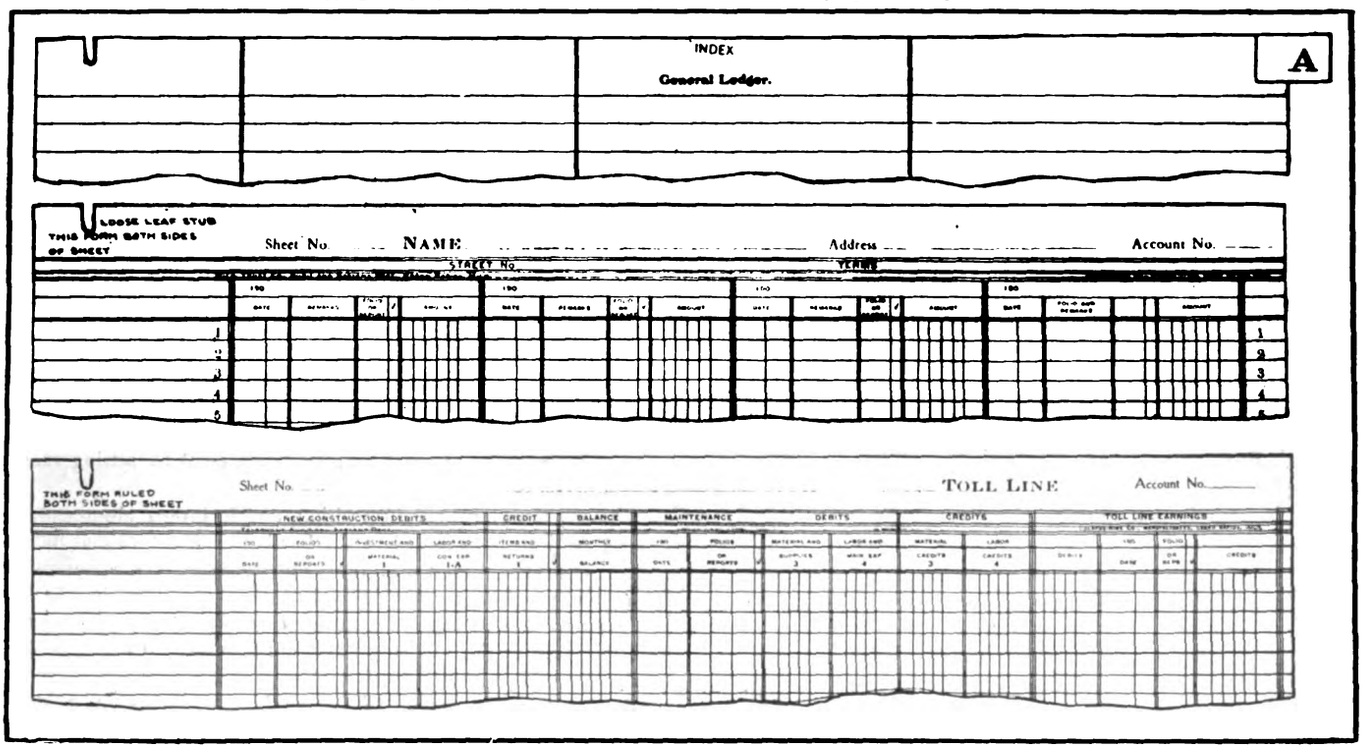

Forms No. 1, 2, and 3, counting downward in order from top of illustration.

*Editor's note: Mr. Wilmot is manager of the Telephone Systems Department of the Edward E. Hine Company.

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for in forms Nos. 3 and 5. All charges of this nature should be closed into the maintenance section at the closing of the year's business.

Under the 5th division, general accounts, come the items for advertising; bond interest; collecting expenses; directory expenses; damage and accidents; freight, express, and cartage; fuel and heat; general office expense; insurance; interest and discount; light; legal expense; office salaries; postage account; pole and right of way rentals; stable expense; soliciting expense; stationery and printing; traveling expense; taxes; water; profit and loss; and dividend account.

In the 6th division, accounts payable or liability accounts; capital stock; bonds issued; bills payable; open accounts payable; voucher accounts payable; advance rentals; unpaid wages; surplus account; unpaid dividends; depreciation.

The above classification is sufficient for the general ledger accounts of most companies. Where further subdivisions are desired for construction, operating and maintenance accounts, we would suggest the keeping of them in an auxiliary record, a book made up with ruled columns for dates, voucher or check numbers and amounts, in which as many subdivisions can be made as desired. Form for this record will appear in a later article.

In the report of the convention of the National Committee on Standard Forms held in June, 1905, a very complete list was given: This report was published in full in THE AMERICAN TELEPHONE JOURNAL, issue of June 24th. It is suggested that this report be cut out and pasted in the cover of the general ledger of all telephone companies for future reference.

Taking up the subject of construction charges there arises the question: "What are legitimate charges?" These include original cost of real estate, buildings, rights of way, cost of franchises, engineering, expenses incurred in negotiating stocks and bonds and discounts allowed on same, interest on bonds during construction, material used in construction, with freight and cartage and cost of labor, switchboard, wire plant, substation equipment and all improvements or additions which increase the value of the original investment. This embraces the cost of new work installed to replace old, less the cost of the old; the difference between the costs of iron and copper in replacing iron with copper wire, etc.

Maintenance charges are supposed to cover the cost of material and labor expended in keeping the inside plant, subscribers' equipment and lines in good condition, thereby making good natural wear and tear and damages by storm or accidents. This division properly includes transportation and traveling expense incurred by men while clearing trouble, wages of wire chief, switchboard men, trouble men, inspectors, etc. It also takes in the cost of moving telephones and changes of subscribers' equipment when these cannot be charged to subscribers, cost of removals, etc.

Operating expenses include the cost of maintaining the traffic department, salaries of local or long distance chief operators, inside trouble clerks, service inspectors, cost of power for operating central office plant, substation batteries, as well as a pro-rata proportion of stationery used, light, fuel, heat and water, dining room expense, etc.

The general expense account covers all accounting and filing department expenses, such as salaries of managers and assistants, clerks, etc., not chargeable to previous accounts mentioned. Into this account can be closed at the end of a period the expense of collectors, directory, stationery, and also printing, advertising, office supplies, light and heat.

The subject of depreciation is a puzzling question over which the average Board of Directors in the rapidly growing telephone companies throughout the country has had many struggles. The border line between maintenance and depreciation seems hard to define to the management, who are not versed in accounting methods. Cost of maintenance can be closely estimated by almost any observant manager and its charges are quite fully defined in a previous section, while depreciation is, in nearly all cases, an undetermined quantity. It is a reduction of the assets of the company resulting not only from natural wear and usage but more frequently from the many rapid improvements in the art

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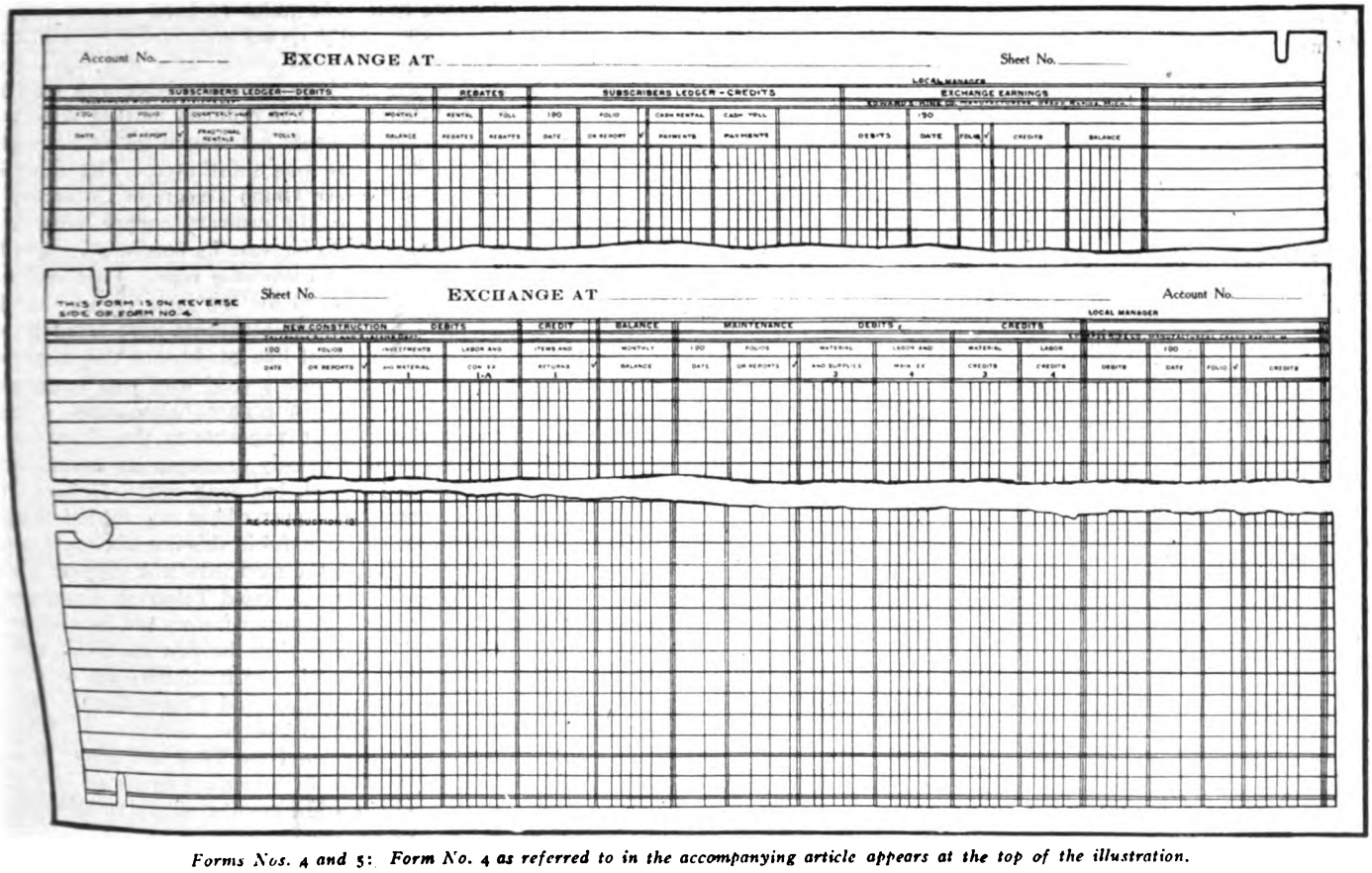

Forms Nos. 4 and 5: Form No. 4 as referred to in the accompanying article appears at the top of the illustration.

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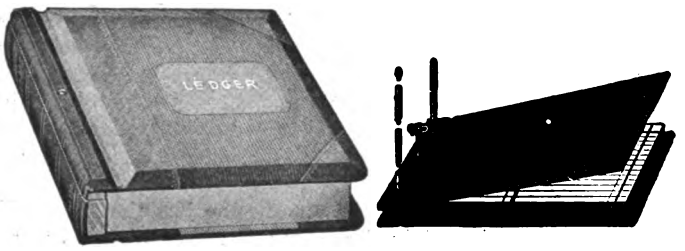
of telephony. These result in new and improved apparatus which render almost worthless some of the exchange equipment which, a few months before, was a valuable asset.

Many conservative expert engineers and managers consider that ten per cent is a fair annual reduction to make, estimating the average life of a telephone plant as not exceeding ten years.



Two Styles of Binders for General Ledger Sheets.

Instead of changing direct to investment accounts thereby reducing insurance values, depreciation can be charged to the profit and loss account, and depreciation account credited, thus showing as a liability.

NOTE.—The next article of this series will be on branch exchange reports to the general office, quite fully illustrated with forms.

HARD DRAWN COPPER WIRE.

BY T. B. DOOLITTLE.

IN an article in the *Harvard Engineering Journal* for November Thomas B. Doolittle, who, by the introduction of hard drawn copper wire contributed to so valuable an extent to the extension of the limits for the transmission of speech, gives the following interesting information:

"Hard drawn copper wire was the result of an adaptation rather than a discovery, although many of its valuable properties were not appreciated until after it had been in service several years.

It is the common knowledge of all who are familiar with the manipulation of copper that the process of drawing it into wire serves to harden the surface. Thus it will be seen that the experiments which resulted in the so-called hard drawn copper wire were based upon a well-known principle, although the application of this principle had never been made use of for the final product. The writer was familiar with this phenomenon at the time he entered the field of electricity; therefore, when it was disclosed to him that copper was not only one of the best conductors of electricity, but was the cheapest in conductivity, or per mile ohm, it was only left for him to determine whether or not this hardening process could be made available, in order that copper wire should be comparable to iron in its ability to stand the strain of its own weight when strung on poles, and, in addition thereto, the weight of sleet or snow and wind pressure. There was no mathematical road to determine this factor; therefore, it was simply a case of "cut and try."

First, the size of the finished product was fixed upon (No. 12 B. & S. gauge); then it became a matter of experiment to determine the size of the annealed copper rod which, when drawn to this predetermined size, should possess the proper tensile strength and the required torsional property. It was also necessary to determine the number of "holes" or reductions that should intervene in the process of drawing in order that the structure or fibre of the metal should not be injured during the process. Too much force would result in granulating the metal and thereby impairing its tensile strength. The experiments proved all that could be anticipated, and a sufficient amount of hard drawn copper wire was manufactured to equip the lines necessary to connect all of the mills, offices and residences of officers of the Ansonia Brass & Copper Company, in whose wire mill these experiments were made. A telephone switchboard was set up in the brass mill of that company, and an operator answered calls and made connections. This work was begun in November, 1877.

Although the product is known in the trade as hard drawn copper wire, and properly so known—as the name indicates its property of hardness and the method of manufacture—the name has no antonym or contra-term because soft drawn copper is a misnomer; the very process of drawing eliminates the quality of softness and makes it hard.

Prior to its introduction for aerial electrical conductors, there was very little, if any, call for the hard product. Copper wire was usually annealed after drawing, and sold in that form. Copper alloyed with other metals was, and is now, used in the manufacture of hard or "spring wire."

Scepticism on the part of electricians and generally in scientific circles, as to the practical value of this adaptation, prevented its being adopted to any extent, except the few circuits that the writer introduced into the Bridgeport, Connecticut, telephone exchange, until seven years afterward.

In 1884 the writer was commissioned to construct an experimental metallic circuit of copper between New York and Boston. The wire for this circuit was drawn under his personal supervision in the wire mill of the Bridgeport Brass Company. The total cost of this experiment was, in round numbers, $70,000. After the experiment was concluded, the wires were turned over to the intervening telephone companies for local use, and immediate steps were taken to build the New York and Philadelphia long distance telephone line. The miles of hard drawn copper wire now in use for all electrical purposes are counted by millions.

The first recorded employment of copper as a line conductor was its use by Prof. Morse in his experimental telegraph line between Washington and Baltimore. The ordinary market wire was used, but for the reason that it would not sustain its own weight, it was abandoned and iron wire was substituted. The next of record was strung by the Western Union Telegraph Company in New Jersey. In this case, also, the ordinary copper wire was used, but an attempt was made to increase its tensile strength by twisting a pair of wires into the form of a rope. This did not prove a success and was abandoned for the same reason as the other. In the early seventies many experiments were tried in attempts to make available for aerial line conductors the superior conductivity of copper. In each case a steel wire was employed for tensile strength. In one case a copper ribbon was wound spirally around the steel wire. On exposure to the elements a chemical action was set up that quickly destroyed the steel core. This ribbon was afterward tinned, but with unsatisfactory result. In another experiment the copper ribbon was folded longitudinally. The last and most successful in this line of experiment was the process of electroplating the steel wire with copper. This was put in service by the American Rapid Telegraph Company, but in a few years it also proved unsatisfactory and was abandoned. Therefore it will be seen that the first successful employment of copper wire for electric line conductors was on the telephone lines of the Ansonia Brass and Copper Company in 1877, and the Bridgeport, Conn., telephone exchange in 1878. The next was on the line between New York and Boston in 1884. The latter experiment was an immediate success, and hard drawn copper wire was, within a few months, adopted throughout all civilized countries.

(*To be continued.*)

ASSUMPTION OF RISK BY EMPLOYEE.

THE Home Telephone Company of Indiana was sued by Earl T. Shaver in the Clinton County Court for damages received in an accident. Shaver was employed with others in unloading telephone poles from a flat car. The poles had been loaded lengthwise and piled up about eight feet high, and were held in place by three standards on each side of the car, which were stayed in pairs with a wire crossing the car. The said wires were cut except the one binding the center standards. Shaver was ordered by the foreman to cut the wire holding the center standards, and on having done so a standard broke and the poles rolled off the car and struck him. The court held that he had assumed the risk and could not recover damages. Shaver v. Home Telephone Co., 75 N. E. 288.

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QUERIES

CROSS-TALK FROM GROUNDED TO METALLIC LINES.—(641.)

I have a metallic circuit that is 22½ miles long, and which has a running transposition every mile. There is a grounded circuit on the same arm that parallels this line for eighteen miles, also another that runs parallel to it for eleven miles. The cross talk on the metallic line is just as bad as when it was a grounded line. Is there any way that it can be made less without making the other two lines metallic? C. C. V.

The cross-talk can be much reduced by increasing the number of transpositions until the distance between two adjacent transpositions is a quarter of a mile. The transpositions should be so located that the first eleven miles of exposure is carefully balanced, and likewise the next seven miles. It is just as important that the transposition be properly and accurately located as it is that there be a sufficient number. The first transposition should be one-eighth mile from the first pole, and the second three-eighths of a mile from the first pole; the third five-eighths of a mile and so on at quarter-mile intervals.

There will be 44 transpositions in the first eleven miles and it will be one-eighth mile from the last transposition to the eleven-mile point. The first transposition beyond the eleven-mile point will be one-eighth mile distant and then transpositions will occur at quarter-mile intervals as before and there will be 28 transpositions in the next seven miles. The last four and one-half miles may as well be transposed every quarter mile if there will be parallel grounded lines in the near future; if there are no circuits of any sort near the metallic circuit in this four and one-half miles, one or two transpositions will be sufficient.

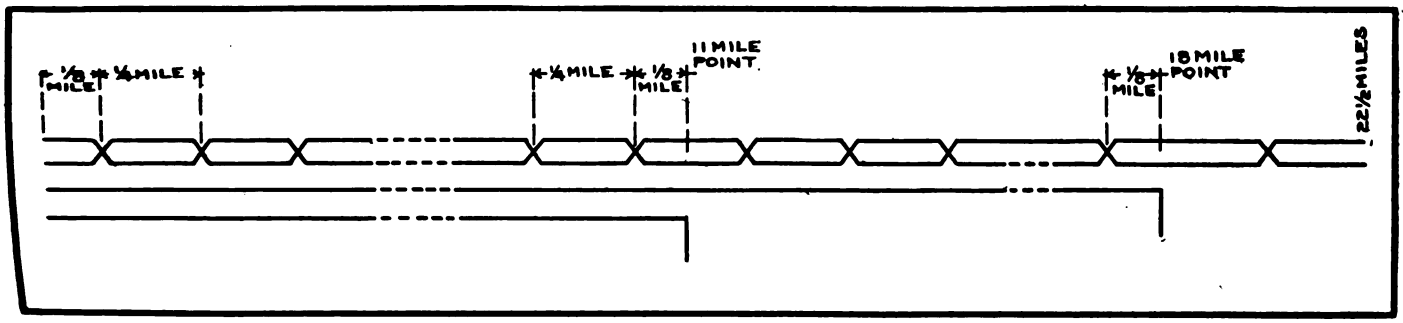

Fig. 641.

If there are any intermediate telephones on any of the three lines, they should be connected at points midway between two transpositions. If the latter is not feasible, the transpositions may be shifted so as to balance the exposures, but in this case you would better submit to us a diagram giving details of the entire lines.

The accompanying figure 641 shows the above method of transposing clearly. If the data given do not completely satisfy your requirements, please submit a detail diagram and map showing all lines and stations.

NUMBER OF MULTIPLE LINES.—(642.)

I understand that it is customary in estimating the number of multiple jacks to install in a switchboard, to put in a certain percentage more than the estimated number of lines expected in the period which is supposed to elapse before it will become necessary to add new equipment. As all possible allowances are made when estimating the number of lines, I fail to see why it is necessary to add still further to this number; that is to say, why is it that the traffic estimate is not questioned, but the additional multiples are put in just the same? C. R. L.

The additional multiples are put in to provide for unoccupied lines which must always be present in every well-arranged multiple switchboard. Your traffic estimate of the number of lines covers only the number which are supposed to be actually connected to the board and working at the conclusion of the period covered by the estimate. As a certain number of jacks must be assigned to groups to provide for additions, etc., it follows that there must always be many unoccupied jacks. An instance of this occurs when a private branch exchange is assigned several adjacent jacks for trunk lines, even though the number of trunks to be installed at the time the branch exchange is cut in service may be very much less than the number laid out to provide for growth. In addition to this there will usually be several jacks which must be idle for a time owing to a change of number or disconnection. In the case of either of these events it is very poor policy to immediately assign the old number to a new subscriber. This would mean that every person calling for the number with the expectation of obtaining connection with the old subscriber would obtain the one who had been most recently connected. Explanations would be necessary, the operator would have to be again called in on the circuit and recourse had to the information desk, or, in a smaller exchange, the chief operator, to obtain the correct number of the person with whom connection was desired. The result would be annoyance to both the calling subscriber and the one who had been assigned the recently vacated number. In addition to this the labor and cost of handling the call would be much increased. It should be evident from this brief recitation that it is necessary to provide for a certain proportion of vacant multiples, and this number will appear as the excess above the traffic estimate of the number of lines to which you refer.

TYPE OF MAIN DISTRIBUTING FRAME.—(643.)

In some offices the cables from outside the building are terminated upon the horizontal side of the main distributing frame, and those from the switchboard go directly to arresters on the vertical side. In others this arrangement is reversed. Can you tell me why this is so? A. F. D.

This is a matter which is determined wholly by local conditions. It is usually conceded that testing facilities are in favor of the frames in which the line cables terminate at the arresters, owing to the fact that in this case the arresters are on the side of the frame nearer the center of the room. The most important considerations, however, are those of space and cost. In taking up the question from this standpoint it is necessary to remember that the number of terminals on the cable side will be from thirty to fifty per cent. higher than the number on the switchboard side. The arresters cost much more than terminals on the horizontal side of the frame. It will therefore be evident that terminating the line cables on arresters increases the expense for this portion of the equipment by an amount proportional to the excess of the number of outside pairs over the number of lines in the multiple.

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THE EDITOR'S PAGE

HEAVY SERVICE INSTRUMENTS.

AT the coming electrical show in Chicago there will be exhibited types of telephone instruments which are so widely separated in appearance, and in the conditions of their usefulness, that they will seem to mark a wide divergence of two paths open for the development of apparatus. There will be small, compact telephones, with few parts, designed for common battery service in the larger towns and cities. Contrasted strongly with these will be instrument cases holding heavy magneto generators, long coil bells, and even boxes for holding batteries within the instrument case itself.

These latter instruments are among the most logical successors of the early types of magneto telephones. A few years ago they would have been useful on ten-party lines in magneto exchanges. Nevertheless, at that time, when there was a strong apparent demand for an instrument with a generator capable of ringing on a heavily loaded line, and with a bell responsive to very small currents, none was at hand. Since that time conditions of telephone service in closely settled districts have changed widely. Automatic calling has brought about the banishment of the generator at the subscribers' station, and the party line itself seems to be moving out of the field.

It becomes evident, therefore, that the development to a high state of practical perfection of a type of instrument which has continued for years in an almost constant state of moderate power and efficiency is due to some extraordinary demand. This urgent need is due to the growng appreciation of the advantage of the telephone in rural communities. The local conditions in many places make party lines especially desirable, aside from the fact that they may be constructed and operated with extreme economy. It is fortunately true that amongst the instruments designed for this class of service there are many which meet all requirements of operation on lines to which are connected many individual subscribers.

THE DISTRIBUTION OF LINES.

MUCH time is being spent by telephone managers in the training of operators, with the object of causing them to attain the highest efficiency in the performance of the work of handling calls. When we say that an operator is efficient, we mean that she not only handles a great number of calls in a given interval, but is attentive to the details of each call, giving prompt, clear responses, offering each subscriber all attention consistent with the speedy performance of her work, and making all connections with accuracy. We believe it is generally recognized that an operator working at a certain determined high rate of speed gives better service than one whose position is insufficiently loaded. This is said to be due to the fact that when working under the pressure produced by the necessity for handling a large number of calls in a short time her mind is more alert, her eyes and hands more accurately directed, and she passes more rapidly from each step to the next in sequence. It has been found that any load less than this critical figure for each individual leads to a lowering of the standard as viewed from the subscribers' standpoint, as well as to the raising of the cost of each connection. Thus the satisfaction afforded to the subscriber by the receipt of good service is diminished, at the same time that the economy of operation is reduced. On the other hand, an overload brings about the slurring of details, long delays for some calls, and general inaccuracy, which produce a most unsatisfactory impression upon all subscribers.

Realizing the importance of keeping the exchange load so steady, and of such dimensions at each position, that the ideal condition of a satisfactory load on each operator, of such size as will enable her to do her best work, may be realized, many companies have carried on extensive traffic investigations. The object of these investigations has been to so distribute the subscribers' lines that the number of calls upon each operator will approach the proper figure throughout each hour of the day. This does not mean the number of calls at each position, as the ability of operators to produce results by efficient team work makes it essential to arrange the lines to provide for this method of handling the business. Moreover, the fact that rates of calling much lower than the maximum prevail during the greater part of the day makes it necessary to leave certain positions blank. It is necessary to provide for the handling of calls terminating at these positions by the operators at adjacent, occupied positions. This condition introduces an additional complication, which, however, does not affect the preliminary, most difficult and most essential step in the work of bringing about a thoroughly desirable arrangement of lines.

In cases where this has been brought about in the most satisfactory manner, the subscribers have been classified in lists, which depend to a certain extent upon the nature of the business of each telephone user, and also upon the districts in which the telephone is located. It has been found that with such classifications, based upon sufficient experience, and a sufficient number of tests to give data for definite conclusions, the average number of calls per day, and the average number made during each hour of the day by the subscribers of a given class, will be found to come very close to a constant quantity, which may be taken as a standard. After this quantity has been ascertained, the plotting of curves for the different classifications gives graphical results which may be utilized to indicate the method of distributing the exchange load to secure the maximum efficiency. This distribution is readily effected by making proper cross connections at the intermediate distributing frame.

It is evident that the essential factor in this process of arrangement is the correct classification of subscribers, and this can only be accomplished after sufficient tests have been made on representative lines belonging to each class to get thoroughly reliable results. As conditions vary so widely in different cities, it is necessary that each manager should determine his own figures. The carrying on of this work has brought out many points which are extremely valuable, as it has such a direct bearing on the two most essential features of central office operating. Its satisfactory accomplishment increases the value of the service to the subscriber at the same time that it reduces its cost to the company. It is to be expected that at the present time, when the value of this branch of telephone work is becoming so well understood, that every exchange manager will devote to it the attention which it deserves. The result of general interest and study with the free communication of results obtained under various described conditions should raise the general understanding of the problem to a point, where a telephone exchange manager will be able to predict the load on a given position at a given time of day with even greater accuracy than that attainable by the manager of a modern electric lighting or street railway plant.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. MCMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

EXPENSE OF HIGHER POLES RECOVERABLE FROM STREET RAILWAY COMPANY.

A street railway company has built its poles on both sides of the streets in such a way as to compel us to erect higher poles at considerable extra expense. We are authorized to do business in the city and had our poles in the streets first. Can we recover the expense of changing our poles from the street railway company? P. E. L.

IT has been held in similar cases that a telephone company can recover from a street railway company the expenses incurred by it in erecting higher poles to prevent its wires from conflicting with those of the railway company. Cumberland Telegraph & Telephone Company v. United Electric Ry. Co. (Tenn.), 29 S. W. 104.

PROTECTION OF RIGHT TO USE EARTH FOR RETURN CIRCUIT.

Our telephone company had been using the earth for a return circuit in the streets of the city for fully ten years under a franchise that was legal and undisputed. At the end of that time permission was given an electric railway company to use the streets. The railway company uses a single trolley wire and also uses the earth for a return circuit. The result is that our telephone wires have become charged with electricity and practically useless. Either company could obviate the difficulty by using a different system at an increased expense, but we do not feel it our duty to put up the extra money because our rights are the older. What remedy would you suggest? O. B.

AN injunction would lie to restrain the electric railway company from interfering with your rights, and it could thereby be required to adopt a system that would not impede the operation of your line.

LIABILITY OF COMPANY FOR FALSE IMPRISONMENT CAUSED BY ITS AGENT.

THE American Telephone & Telegraph Company was extending its line in Cumberland County, N. C. In attempting to erect its poles across the line of one L. C. Jackson a dispute occurred which finally resulted in Jackson bringing suit against the company to recover damages for false imprisonment. He alleged that one McManus was the agent of the company and that he caused a warrant to be issued for Jackson's arrest upon the charge of an assault with a gun and that he was taken into custody by the sheriff and confined in jail about a day. The company alleged that it had two departments, the right of way and the construction departments, and that McManus was assistant foreman and employed by the foreman of the construction department; that Jackson assaulted McManus with his gun and that the arrest had nothing to do with the work of the company and was not authorized by the company or any of its agents; that Jackson signed a "voucher" in the regular form giving the company the right to build, operate and maintain its line on the land, stating that it was his wife's property and afterwards claimed the land as his own and refused to carry out the agreement. Jackson obtained a verdict against the company and the case was appealed to the Supreme Court, the principal question involved being whether McManus was the agent of the company or not. The court held that in passing on the question of agency it was proper for the jury to consider any of the acts of the alleged agent in connection with the defendant's work and whether such alleged agent was in charge of defendant's work with authority. It further held that the fact that an assistant foreman was employed directly by the company's foreman did not render the assistant foreman any the less the company's agent. The act of a servant of a telephone company in causing a land owner to be unlawfully arrested for the purpose of putting him out of the way, so that the company's agents and servants might erect poles on his land, is an act done in the course of the company's employment and in furtherance of its business for which the company is responsible. The plaintiff's judgment was accordingly affirmed. Jackson v. American Telephone & Telegraph Company, 51 S. E. 1015.

LIABILITY OF COMPANY TOO REMOTE.

THE Rochester Telephone Company at Wabash, Ind., has just won a curious case, defining as the decision does the limitation of the liability of similar corporations for injuries. The plaintiff in a suit for damages was Mrs. John Flinn, who demanded $10,000, alleging that her husband was killed by a flash of lightning which struck the telephone wire, burned off the wire and insulation and allowed the ends to fall across a barbed wire fence. At a pig pen, fifty feet from where the wire terminated, Flinn was standing, leaning on a rail fence that joined the wire fence, his distance from the toll telephone line being seventy yards. Judge Benetha of the Marshall Circuit Court held that the liability of the telephone company was too remote and dismissed the suit.

LIABILITY OF TELEPHONE COMPANY FOR INJURIES FROM LIGHTNING.

SINCE our last discussion of the liability of telephone companies for injuries arising from lightning conducted over their wires, several interesting and important cases on the subject have been called to our attention. We will refer to these briefly in order that this subject may be better understood, as we have had a number of inquiries concerning it from time to time.

A telephone company having reasonable grounds to apprehend that lightning will be conducted over its wires into the house of a subscriber, and there do injury to persons or property, must exercise due care in selecting, placing and maintaining, in connection with its wires and instruments, such known and approved appliances as are reasonably necessary to guard against such accidents. Griffith v. New England Telephone & Telegraph Co., 72 Vt. 441, 52 L. R. A. 919.

Attaching a telephone wire to a flagstaff on a barn without the owner's consent or knowledge, and leaving it connected only with a pole on another building, renders a telephone company liable for the burning of the barn by lightning conveyed by the wire over the pole on the other building. Jackson v. Wisconsin Telephone Co., 83 Wis. 243, 26 L. R. A. 101.

Injury caused by electricity generated by a thunderstorm in a telephone wire which was negligently allowed to hang across a highway so low that a traveler came in contact with it in the dark, renders the telephone company liable, as the wire furnished the means by which the dangerous force was communicated and the injury caused. Southwestern Telephone & Telegraph Co. v. Robinson, 2 U. S. App. 205, 16 L. R. A. 545.

The doctrine of *res ipsa loquiter* was applied in the following cases: Hayes v. Raleigh Gas Co., 114 N. C. 203, 26 L. R. A. 810; Alexander v. Manticoke Light Co., 209 Pa. 571, 67 L. R. A. 475.

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IN THE OPERATING FIELD

TERRE HAUTE COMPANY TO EXTEND ITS UNDERGROUND SYSTEM.

THE Citizen's Telephone Company, Terre Haute, Ind., submitted to the Board of Public Works for its inspection an agreement the company proposes to enter into with the city for the right to extend its underground conduit system in the immediate future.

The present system of the company extends along the principal streets of the city. While the proposed extension will practically cover all the business portions, trunk routes will carry the main leads, which will be tapped at desirable points for lateral runs. The proposed system will do away with a large number of poles now used by the company.

In case the agreement is entered into the work on the extension of the conduits will be undertaken at once. It means an outlay of at least $35,000.

In the contract with the city the Citizen's Company agrees to give the city the use of a section of the conduit for its fire and police alarm wires.

ROCHESTER STOCK EXCHANGE LISTS INDEPENDENT SECURITIES.

THE governing board of the Rochester Stock Exchange held a meeting recently and decided to list the securities of the United States Independent Telephone Company. These securites will be traded in on the exchange. The amounts listed and issued are, in bonds, $12,715,000, and in stock, $5,086,000. The stock listed is only the 40 per cent. that was to go with the bonds of the new company.

That the Rochester Telephone Company will be a part of the United States Company is now assured. Albert O. Fenn, of the Alliance Bank, who has acted as agent for the company, in a recent statement said "that nearly all of the stock of the telephone company had been turned in for securities of the United States Company."

NEW INDEPENDENT TOLL LINE IN NEW YORK STATE.

INDEPENDENT development throughout the State of New York has been very rapid. The whole of the Western and Northern parts are covered with exchanges and toll lines for interconnection between the towns within the State. In addition to these long distance lines reaching into Pennsylvania, New Jersey and Ohio have been built and are now being augmented with new circuits to handle the ever increasing business. One of the most recent additions to this network of Independent circuits is a toll line which connects with the towns of Clinton, Plattsburgh, Champlain, Mooers, and Rouses Point. In this territory there are upwards of a thousand subscribers, who will be benefited by the new circuit. The rates are low and consequently the traffic is heavy. In all probability new lines will have to be added to take care of the growing volume of business.

TERMINAL COMPANY OF DES MOINES INSTALLS NEW SWITCHBOARD.

THE Mutual Terminal Telephone Company of Des Moines, Ia., is installing a new switchboard which involves the expenditure of about $10,000. The company expects to be using the new board within a short time.

The telephone companies associated in the Mutual Terminal Company are the Hawkeye, the Jasper County Telephone Company, the Boone County Telephone Company, the Knoxville Electric Company and the Southern Iowa Telephone Company. All these companies have a working agreement whereby the lines of each company can be used for long distance service. A very large number of the farm lines throughout the State are managed by these five companies, and it is to improve the service to be received by these as well as by its own subscribers that the new equipment is being installed by the Mutual Company.

CONSOLIDATION OF INDEPENDENT COMPANIES IN OHIO RECENTLY EFFECTED.

PRESIDENT FRANK L. BEAM of the Ohio Independent Telephone Company, assisted by Dwight E. Sapp of Mount Vernon and by Columbus and Marysville capitalists, has succeeded in organizing all the Independent telephone companies in Union county, of which Marysville is the county seat, into one organization, which is named the Union County Telephone Company. Several other county exchanges have been organized under the plan, and it is proposed to organize other counties in a similar manner and merge them into an Ohio Independent telephone company. This is to be a general holding company for many county and local telephone companies, which will be a power in the telephone business of the country.

NEW PLANT OF CORN BELT COMPANY WILL SOON BE IN OPERATION.

A FEW months ago Stanley S. Lichty and J. H. Shoemaker of Waterloo, A. F. Averill of Cedar Rapids, together with a few other parties in Waterloo, purchased from T. Cascaden and F. F. McElhinney the telephone exchange at Waterloo, Ia., in the name of the Corn Belt Telephone Company. Immediately after taking possession an entire reconstruction of the system was started, which included laying of underground cable, erection of a new building and the installation of a new switchboard.

The building is brick, two stories in height. On the lower floor are the general offices and on the upper floor are the operating and retiring rooms. The switchboard has a present capacity of 2,000 lines, which can be increased as business warrants. It is of the common battery type and is finished in walnut. The operators' retiring room is tastefully finished and is provided with rocking chairs, reading table and a lounge. On the floor is a moquette carpet and pictures adorn the walls. The present operating force will include a chief and ten operators. The Corn Belt Company covers the country in the neighborhood of Waterloo and connects with upwards of 300,000 subscribers in different parts of the State.

IMPORTANT CONSOLIDATION OF INDEPENDENT PLANTS TAKES PLACE IN KANSAS.

BY a recent transfer all the property, franchises and all other rights and emoluments of the Home Telephone Company of Parsons, Kan., became the property of the Citizens' Home Telephone Company. This brings under a single control the telephone exchanges at Parsons, Pittsburg, Oswego, Chetopa, Altamont, Mound Valley, Edna and Bartlett, practically covering the county with a network of wires, while the company's toll lines cover the entire southeastern part of the State, giving communication with Kansas City. A copper wire is already operating from Oswego by the way of Coffeyville and Chetopa to Independence and the wire is now at hand for other connections that will be made shortly, enabling the Parsons subscriber to sit in his office and talk with Kansas City without the additional expense of a messenger. The company is capitalized for $500,-

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000, with Jas. A. Platner, the former owner of the Pittsburg exchange, president; George H. Spangle, secretary and superintendent of equipment, and C. H. Kimball, treasurer. With the new company embracing as it does a large territory and with new equipment of the most improved kind, which has just been installed, there is every reason to believe that the service of the new exchange will be all that the people can desire.

EXHIBITS FOR CHICAGO ELECTRICAL SHOW ARE NOW WELL UNDER WAY.

MILLIONS of dollars will be represented in the Electrical Show to be held in the Coliseum from January 15 to 27. In fact, never before in the history of Chicago has there been an array of exhibits which represented so many and such wealthy and influential concerns. In the list of firms which have already entered for space, there is not one of the larger electrical companies missing. Up to December 20, 1905, the number of firms who had contracted for space was 113, and over half of this number will have exhibits of direct interest to telephone men.

On January 14, the day before the formal opening of the exhibition, the Sunday Chicago *American* will print a specially arranged and designed four-color supplement, containing from 12 to 20 pages. This will be devoted exclusively to features of the show. A circulation of over 600,000 copies is guaranteed for this special edition.

Numerous representative telephone men from different parts of the country have expressed their intention of visiting this show. The great attention paid by the manufacturers to their exhibits will make it an extremely instructive, as well as a pleasant affair. In addition to the regular features telephone men have been invited to take advantage of their visits to Chicago to hold conventions and meetings for the discussion of matters relating to the development of telephony.

There are to be no fakirs in the electrical show. The management has refused to sell space to hundreds of people who desired to profit from the expected crowds, but everything that is not identified with the electrical field and electrical developments is barred.

During the two weeks of the show there are to be several special days. The 200th anniversary of Franklin's birth will be observed on Wednesday, January 17, and bronze medallions are to be distributed as a souvenir of the occasion. The Northwestern Electrical Association will meet at the Great Northern Hotel, January 17 and 18, attending the exposition in a body the second night of the convention. The telephone men will be specially cared for January 22, 23 and 24. One day will be set apart for the technical classes in the schools and colleges, many of which will send large delegations to Chicago. Purdue has already decided to send a trainload of students. Many of the colleges in the middle west are making exhibits.

The management in its desire to be absolutely up-to-date and new in everything, has engaged Weil's Band of St. Louis to give afternoon and evening concerts during the show. This was the official band at the St. Louis Exposition, and has never been heard in Chicago.

MUNICIPAL OWNERSHIP PLANS IN CHICAGO INCLUDE TELEPHONE SYSTEM.

It is rumored that Mayor Dunne, of Chicago, will immediately after the holiday recess urge that steps be taken toward the municipalization of the telephone system.

It is said that in the Mayor's recent negotiations with the representatives of the Chicago Telephone Company he did not lose sight of the opportunity to indicate his wish that, in any future agreement between that corporation and the city, there should be inserted in the contract a provision stipulating that the municipality might take over the lines and plants of the company whenever the Legislature shall have passed the necessary enabling act.

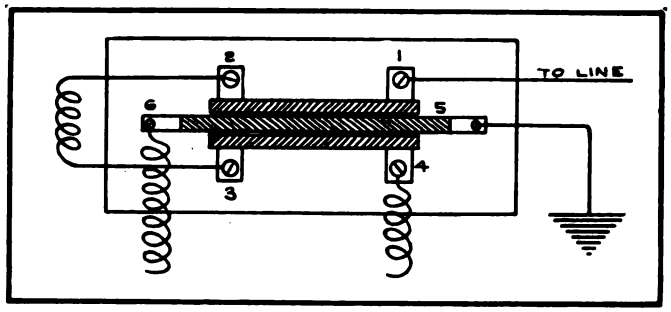
It is announced that Mayor Dunne will not only use every endeavor to secure an iron-bound contract with the telephone company looking toward municipalization, but during the next year he will agitate the desirability of passage by the Legislature of the requisite enactment.

If this were actually brought about it would involve the amusing possibility of making the City of Chicago a sub-licensee of the parent Bell Telephone Company, owing to the taking over of the system of the Chicago Company, which at present maintains that relation.

A LIGHTNING ARRESTER SCHEME.

By G. R. Morris.

WHERE a grounded line is employed I have found the following scheme for connecting the circuit to a No. 400 type lightning arrester to give excellent results: Bring the line wire to post 1, then connect posts 2 and 3 together through a wire coil. Run the ground wire direct to post 5, con-



Connections of Lightning Arrester for Use on Grounded Line.

nect the instrument to posts 4 and 6 through coils, as shown. The object of the coils is to prevent lightning taking a path to the instrument. The coils offer a path of very high self-induction to the rapid oscillations of the lightning discharge. In consequence, the discharge takes the easier path across the air gaps to the ground carbon and thence to earth. By wiring up the arresters in this way, I secure a greater arcing space for the carbons than if only one side is connected up, and they don't appear to give off as much dust when a discharge takes place.

CONVENTION OF ELECTRICAL SALESMEN TO BE HELD DURING CHICAGO SHOW.

ON January 20, 1906, will occur the first regular meeting of the American Electrical Salesmen's Association, at the Grand Pacific Hotel, Chicago. This association was organized at Peoria, Ill., October 5, 1905, with thirty-five charter members, and will be actually launched at the next regular meeting this month, with over a hundred members who will respond to roll call.

So great has been the interest shown by the members that it will be safe to say that at this meeting fully three hundred salesmen will attend. A programme has been arranged which will contain the names of such prominent speakers as J. Robert Crouse, of Cleveland, and R. C. Lamphier, of Springfield, Ill., who will tell the members things of vital importance regarding salesmanship. A most interesting meeting is expected, and one that will be valuable to all members of the organization.

The purposes of this association are: First, good fellowship; second, the making of more efficient salesmen; and third, the advancement of the electrical industry in general. The great aim which the organizers had in view when this movement was started was simplicity of obligations upon its members and a set of bylaws have been devised which impose few restrictions.

More information concerning this association can be obtained by writing to the secretary, George H. Erich, 88 Washington street, Chicago, who will gladly furnish application cards, copies of by-laws, etc., upon request.

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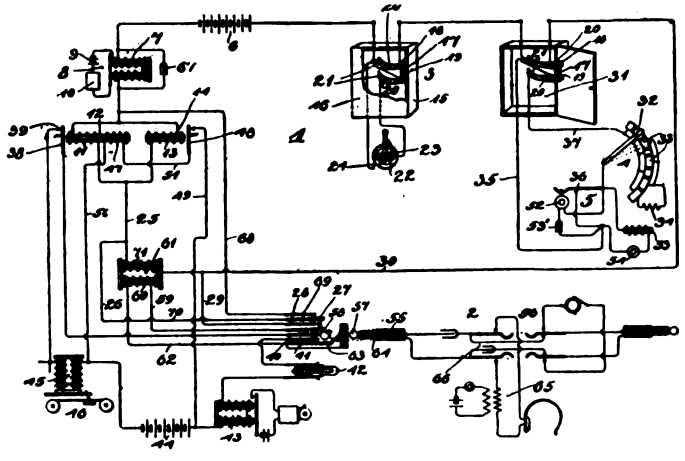
TELEPHONE PATENTS

ALARM AND TELEPHONE SYSTEM.

Garrison Babcock, Chicago, Ill., patents (No. 807,235; dated Dec. 12, 1905; filed Dec. 14, 1903; serial No. 185,090) an alarm and telephone system.

This invention provides a means whereby fire alarm and police signals can be transmitted over a telephone line. In the illustration, 2 is a central exchange, 3 a fire alarm station, 4 a police signal station, and 5 telephone apparatus. All this is included in a normally closed circuit with a battery 6, and relay 7, which



is adapted to open and close an alarm circuit 8, including a battery 9, and receiving and recording instrument 10. Windings on relays 12 and 14 are also included in the line circuit. Opening the cover of the fire alarm signal 3, withdraws the bridge contact piece 17 and carries the contacts 20 to open between contacts 18 and 19 and other contacts 21 connected with interrupter 22. This alternately opens and closes the circuit. Relay 7 is actuated and closes its circuit giving signal by indicator 10. For reasons to be described no other signal apparatus at the exchange operates. A police code signal is sent in as follows: Alternate contacts 33 are closed through resistance 34 to line 37, others are connected direct. Moving line 32 over these contacts on some points closes the circuit directly, and on alternate contacts, through a resistance. Tracing the circuit from battery 6 it follows the same path as the fire alarm circuit to bridge contact 20 of the containing box of the police signal mechanism, to conductor 35, switchhook 36, lever 32, alternate contacts, wire 37, and back to battery through bridged contacts of fire alarm signal box. Relays 7, 14 are gauged to release their armatures only when the current flow is broken, hence the fire alarm mechanism will not be operated, but the winding 11 of relay 12 is more delicate, and a slight decrease in current strength causes it to release its armatures which then closes a local circuit including a magnet 45 for controlling recording apparatus, battery 44, relay 43, lamp 42, jack springs 40, 41, the fluttering of the lamp notifying the operator of a police signal.

As the windings 11, 13 are in parallel, to prevent the release of armature 13 when a fire alarm signal is sent in, an additional winding 47 is provided. The release of armature 48 closes its circuit through battery 44 and thus armature 38 is inoperative. When calling by telephone the current is completed through the transmitter 54 and retardation coil 53, the main circuit being open at the lower hook contact. This causes a sufficient weakening of the current to operate relay 12, but the recording signal 42 will be permanently instead of intermittently illuminated, and thus the operator is notified of a connection. Plugging into the jack she opens the signal circuit at springs 40, 41, 27, 28 and completes a local circuit through winding 60 of repeating coil 61. Transmission from the telephone 5 is accomplished as follows: Battery 6, relay winding 7 shunted by condenser 67 to overcome its impedence, conductor 68, jack springs 69, 27, conductor 70, primary winding 71 of repeating coil 61, conductor 30, bridge contact 20, conductor 35, then in parallel through receiver and transmitter circuits to arm 32, conductor 37, bridge contact 20 back to battery.

An examination of the drawing will show that conductor 68 shunts windings of relays 12 and 14, thus removing the impedance for telephone purposes.

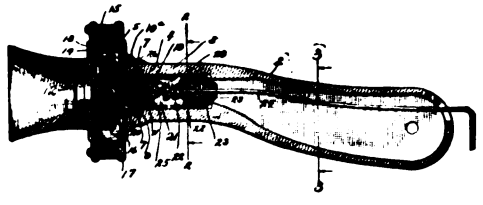
The various claims embodied in the patent broadly cover the application of the principles involved in the above circuits to the combination of fire and police alarm signals to telephone circuits.

TRANSMITTER AND ARM CONNECTION.

Ernest E. Yaxley, Chicago, Ill., patents (No. 807,528; dated Dec. 19, 1905; filed March 18, 1901; serial No. 51,809) and assigns to American Electric Telephone Company of Chicago a transmitter and transmitter arm connection.

In this invention means are disclosed for the construction of a transmitter and specially designed transmitter arm which are said to overcome difficulties met in securing good electrical connection between the usual type of transmitter head and arm and between the contacts of the conductors forming the other side of the transmitter circuit.

For this purpose the transmitter arm 2 is given a cylindrical shape 3, and adapted to receive an annular flange or tubular bore 4, attached to or forming a part of the back of the transmitter head 5. This cylindrical portion is split lengthwise, the two portions being held together and clamped by screws passing through the opening 7. The boss of the transmitter head is provided with an annular groove 11 so placed that it is impossible to withdraw the head without removing the screws. To the rear electrode of



the transmitter is attached a contact pin 19, which presses against a spring supported terminal seated in an insulating washer 23. To this terminal the insulated connecting wire is attached. This construction permits rotation of the transmitter head to prevent packing of the carbon granules as the adjustment of the clamping screws may be such as to permit a revolving movement of the head under a certain amount of tension which will not affect its electrical conditions. It is further claimed that a more reliable contact is obtained than with the usual set screws.

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FOR SALE—February 1st we will cut over the central energy and will sell all or a part of the following: Kellogg Magneto Express Switchboard, Lamp Transfers, Seven Positions, 150 numbers each; Kellogg Iron Distributing Frame, capacity 1,250 numbers, with 900 arresters installed; Holtzer-Cabot, Direct Connected Motor Generator, Charging Machine; Holtzer-Cabot Direct Connected Motor Generator, Ringing Machine; Four Cells, No. E-9 Chloride Accumulators, Marble Power Board, 900 Magneto Telephones. This apparatus is practically new, and at present in operation, giving good service. It can be seen and examined by parties interested. Address Lynchburg Telephone Company, S. H. D. Freed, Manager, Lynchburg, Va. 517.

FOR SALE—One-fourth interest in one of the best paying telephone companies in Western Kansas. Plant run less than two years. Growing all the time. Good instruments. Chance for young man who has had experience in telephone business. Address T. F. Poole, Grainfield, Kan. 522

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WANTED—By a large telephone and switchboard factory, several young men not over twenty-two years of age, to enter its apprenticeship course, where they will be trained to install and operate large modern telephone switchboards. Address, stating age, experience and education, Box 503, care The American Telephone Journal, 116 Nasasu street, New York City. 503

THE best resolution a man can start the New Year with, is to secure the position for which he is best adapted. Our business is to help you find that place. We may now have it among the thousands on file at the various offices in the larger cities. If your name is not listed with us, it should be. Write us for information to-day. Hapgoods, Suite 511, 309 Broadway, New York City. 464

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A SECRET SERVICE SWITCHBOARD.

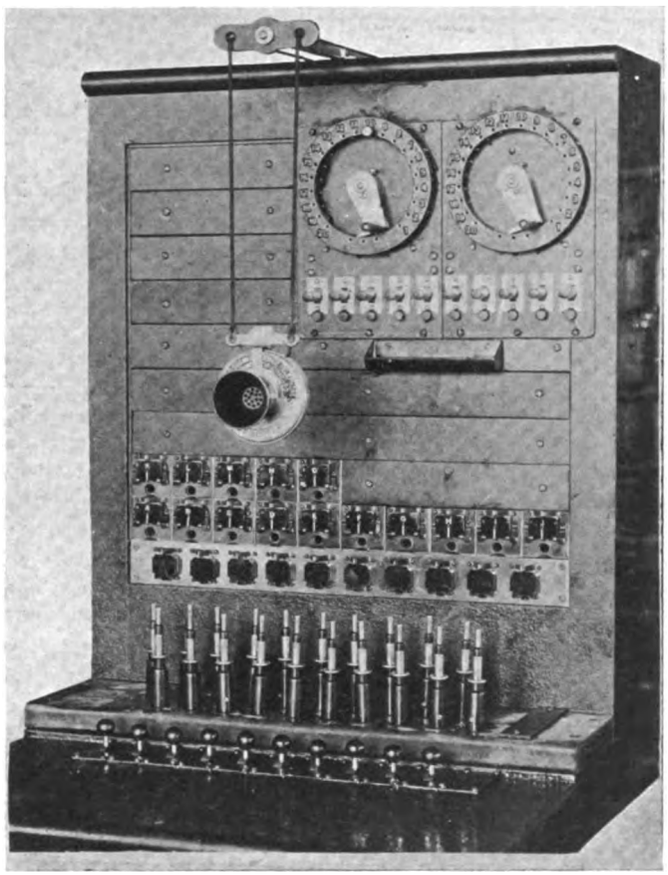
THE accompanying illustration shows the rural line board recently designed for the Citizens Telephone Co. of Decatur, Ind., by the Baird Manufacturing Co., 6 Michigan street, Chicago. This switchboard is equipped to take care of 15 rural lines as shown by the drops lettered "A" to "O." Each of these lines has a capacity of 19 telephones, making a total capacity of 285 instruments, each of which, by virtue of the lockout system, enjoys the same privacy as an individual subscriber on an individual full metallic circuit.

The calling devices shown in the upper right hand corner operate the lockout mechanism of the various telephones on the line and are connected into the cord circuits of the switchboard in such a manner that one calling device is sufficient to take care of all the calls an operator can handle with five pairs of cords.

There is no connection between the instruments on the line and the calling device until the operator plugs in, the calling device being connected into the cord circuit and not the line circuit.

Six months ago the Decatur people had 10 of the secret service instruments in use. To-day they are using 130 and equipping their exchange to take care of double their present facilities.

The growth of the Baird Manufacturing Company's business in this line of telephones in the face of the many unsuccessful attempts to develop a practical working lockout telephone system clearly shows that its apparatus must have substantial merit.



Baird Secret Service Switchboard.

VINTON A. SEARS, of Boston, Mass., who some months ago resigned from the various automatic telephone companies in Massachusetts, has moved to the Sears Building, Boston, where he will continue to be interested in Independent telephone work and securities. He will, however, be independent of any particular system of telephony. Mr. Sears organized the Automatic Telephone Companies at New Bedford and Fall River, Mass., which were the first in the world to demonstrate the feasibility and practicability of the automatic or "girlless" system. Mr. Sears is the author of that well-known book "Telephone Development, Scope and Effect of Competition," the second edition of which required 5,000 copies for this country and Europe.

THE STERLING ELECTRIC COMPANY seems to have its motto, "Once a customer, always a friend," well borne out by the large number of repeat orders it daily receives from old customers. The following partial list of orders for additional switchboard equipment, not only indicates well satisfied customers, but a prosperous condition of affairs in the Independent field generally: Hudson, N. Y.; Seymour, Ind.; Beverly, Kan.; Saginaw, Mich.; Elizaville, Ind.; Wolcott, Colo.; La Grange, Mo.; Shelbyville, Ind.; Huntsville, Texas; Brookville, Pa.; Mt. Vernon, Ind.; Mulvane, Kan.; Max, Ind.; Elkhart, Ind.; Charleston, Ill.; Bloomington, Ind.; Smithland, Ky.; Fedora, S. D.; Champaign, Ill.; Kentland, Ind.; Hallsville, Mo.; Boswell, Ind.; Terre Haute, Ind.; Robinson, Ill.; Earlvile, Ill.; Defiance, Ohio; Sioux Falls, S. D.; Pittston, Pa.; Wilkesbarre, Pa.; South Raub, Ind.; Cheboygan, Mich.; Abilene, Texas; Clarksville, Tenn.; Yankton, S. D.; Rantoul, Ill.; Henry, Tenn.; Hamilton, Mo.

THE DEAN ELECTRIC COMPANY of Elyria, Ohio, has received two orders for complete common battery central office equipment and telephones from California, one for the Corona Home Telephone Company, Corona, Cal., and the other for the Compton Home Telephone Company, Compton, Cal., the former being equipped with a complete Dean harmonic 4-party line ringing system, including Harmonic Converters, while the latter is supplied with individual indicating ringing keys and ringing machines for 2-party selective ringing. The company also reports that the United States Army Signal Corps has in addition to the five hundred field telephones recently ordered, placed an additional order for two hundred telephones, one hundred and fifty of which are of the Dean standard Fourteen Twenty Type local battery style, while the remaining fifty are the standard Dean local battery desk stands. The Government also has ordered two switchboards of a new type.

THE F. BISSELL COMPANY, Toledo, O., has recently issued a small booklet entitled "Securities." In it are illustrated several types of "Security" cable pole houses, cable distributing panels, fuses, distributing rings and many other appliances, the uses of which, in both aerial and underground construction, are well known. As indicated by the title of the book, especial attention is given in the apparatus described to the securing of sufficient strength to safeguard the workman. The descriptions are very complete and thoroughly illustrated, and the book is well worth the attention of all managers interested in obtaining the best construction of their wire and cable plants.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY has been making an increase in the capacity of its factory, which will enable its output to be doubled. Some of its recent shipments are as follows: Telephones and two switchboards to the Patrons Telephone Company of Fulton, N. Y.; switchboards and telephones to the following: Citizens Telephone Company of Little Valley, N. Y.; Attica Telephone Company of Attica, N. Y., and the Williamsville Telephone Company of Williamsville, N. Y. Also a complete central office equipment to the Weedsport Telephone Company of Weedsport, N. Y.; switchboard to the Springville Telephone Company of Springville, N. Y., and also to the Hamburg Telephone Company of Hamburg, N. Y.; complete central office equipment to the Rush Telephone Company of Rush, N. Y. It is also building a multiple, common battery lamp signal switchboard for the Livingston County Telephone Co. of Dansville, N. Y., and for the Citizens Tel. Co. of Bath, N. Y. Both exchanges will have the Century Four Party Selective System.

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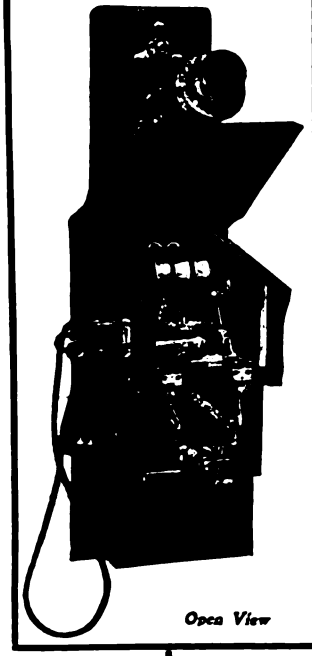

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IN THE MANUFACTURING FIELD

A NEW TRANSMITTER.

THE requirements of the Independent telephone service are now so extended that the necessity in all plants for a transmitter capable of being used indiscriminately over both short and long distances with the best possible results is evident to every manager who gives any thought to the subject.

The Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y., has just designed a new transmitter which is said to give soft and pleasing transmission over short distances, and still be capable of transmitting speech over very long lines with the least possible exertion on the part of the speaker.

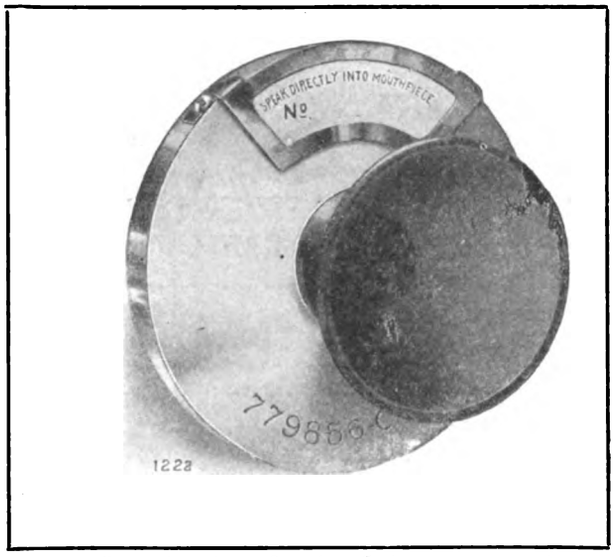

Fig. 1. Front view of new Stromberg-Carlson transmitter, showing external appearance.

Without going deeply into the theory of telephone transmitters, it can be stated that the volume of transmission depends upon the change of distance between the electrodes, brought about by the vibration of the diaphragm. The company claims that in all of the forms of transmitters now in use only one of the electrodes is vibrated with the diaphragm, and in the better forms this one electrode takes up the same amplitude of vibration as the central point of the diaphragm, which, of course, is the point of maximum movement. In the new transmitter shown in the accompanying illustrations both of the electrodes are attached to the central point of the diaphragm, and there is thus produced a variation in the distance between the electrodes of twice the amplitude of vibration of the central point of the main diaphragm.

It is claimed that a transmitter constructed along these lines will produce a greater volume of transmission than if only one of the electrodes is movable. This transmitter is given such an adjustment that under ordinary tones of voice the volume is even less loud than with some of the forms of sensitive transmitters now being manufactured, but as the voice is raised the volume of transmission from the instrument is multiplied twofold, so that the transmission when talking in a loud tone of voice has much more volume than that from any other type. The advantage of this is readily seen.

The mechanical construction of the transmitter follows out the practice that has been found to be the most satisfactory for high-class apparatus: that is, the use of highly-polished carbon electrodes and irregularly formed carbon granules enclosed in a practically moisture-proof case, using no absorbent material whatever, so that the transmitter when once assembled should be entirely free from any bad effects due to atmospheric changes, and should be equally as efficient in any climate. The transmitter is made more durable, particularly in damp climates, by the use of an auxiliary moisture-proof diaphragm over the main diaphragm, thus preventing any chemical action of the main diaphragm, due to moisture or alkali from the breath.

The illustrations, Figs. 4, 5 and 6, clearly show the construction of the instrument. It should be observed that what corresponds to the front electrode in the ordinary transmitter, is divided into two halves, each forming a terminal. The back disc with highly polished carbon is used only as an electrical connection between the two halves of the transmitter. Fig. 3 shows the diaphragm with the connectors and cup attached. Fig. 4 shows the front view of the cup with the diaphragm removed, and the method of fastening the connectors to the electrodes. Fig. 5 shows the cup dismounted with the granular carbon removed; "*a*" shows the front of the cup with the electrodes fastened to the auxiliary mica diaphragm; "*b*" shows the cup with the back carbon disc. Fig. 6 illustrates the parts of the cup; "*c*" is the back or neutral

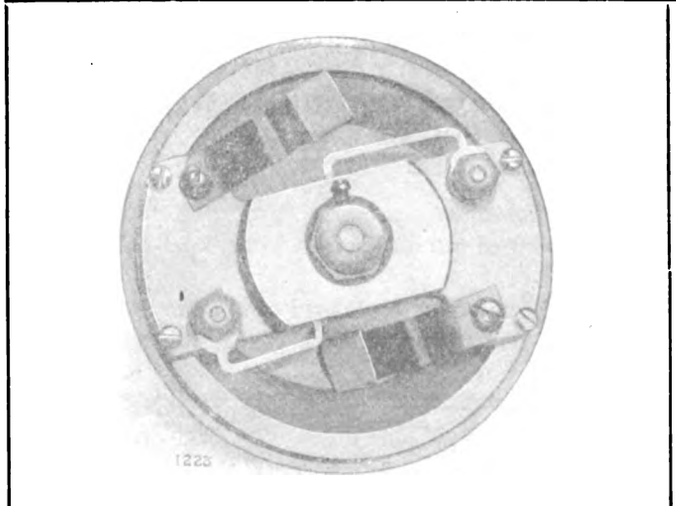

Fig. 2. Back of front part of new Stromberg-Carlson transmitter, removed from case.

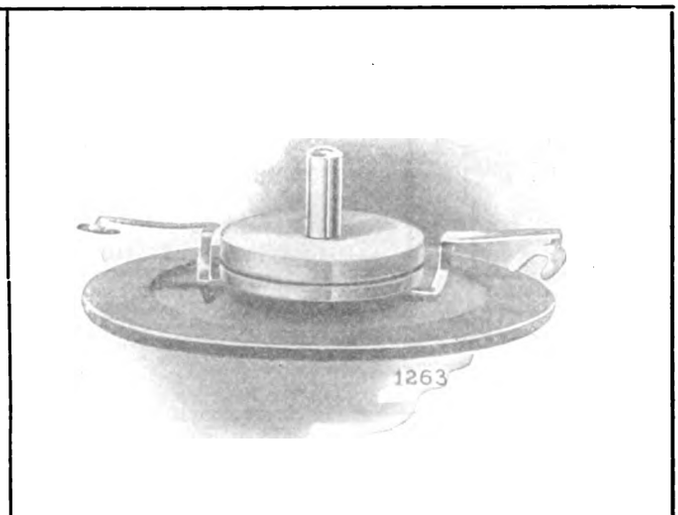

Fig. 3. Diaphragm of new transmitter, with connectors and cup attached.

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carbon disc; "*d*," the cup; "*e*," the separating ring; "*f*," the electrodes and mica diaphragm; "*g*," the clamping ring.

The various parts of the transmitter are made in accordance with the highest standard established by careful experiment and observation under practical conditions.

The carbon electrodes used in this transmitter are manufactured by the company itself of a special grade of very dense carbon properly treated, so that it is of exceedingly low resistance, and securely soldered to the connecting discs without the use of any salts or acid. The surfaces of the carbon buttons are very highly polished, which lessens the danger of the transmitter packing, and prevents arcing. The granular carbon is also manufactured in the company's own shop, and great care is exercised in selecting the raw material and in preparing the product, so as to produce the proper resistance to give the best results. The carbon is so thoroughly cleansed that it is all of such density that it will be entirely free from dust, which has a tendency to film the electrodes and seriously impair the transmission.

The diaphragm is made of extra hard aluminum, and is carefully straightened in a powerful machine of special design. It is protected by a celluloid disc. The auxiliary diaphragm for sealing the carbon cup is made of the best selected India mica carefully

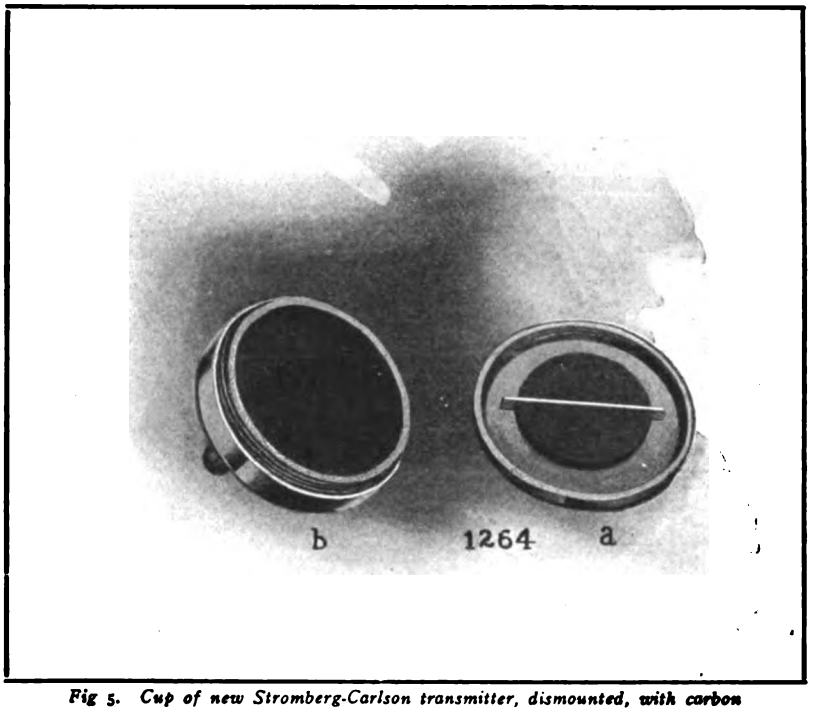

Fig 5. Cup of new Stromberg-Carlson transmitter, dismounted, with carbon removed.

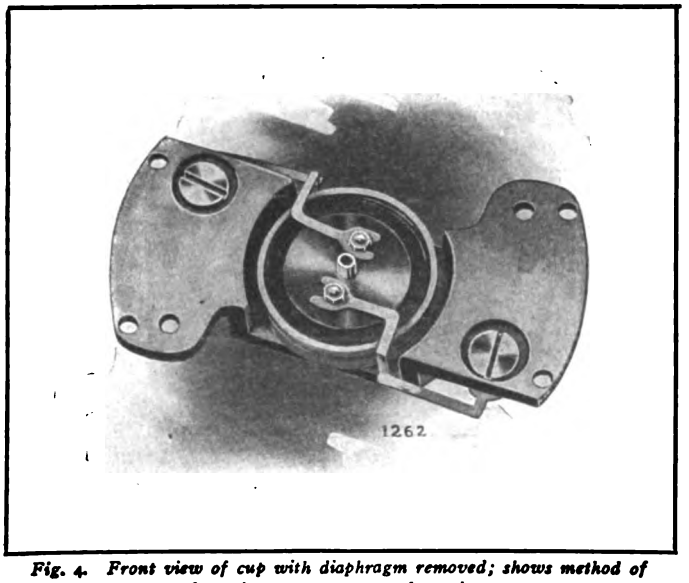

Fig. 4. Front view of cup with diaphragm removed; shows method of fastening connectors to electrodes.

gauged to thickness, so that all transmitters will be alike, and is securely held in place by the clamping ring.

The rubber band for insulating the diaphragm against vibration from the retaining case, is made of a very high grade of rubber, in order to insure its remaining soft and pliable and to prevent any tarnishing of the inside of the retaining case.

The bridge is made from heavy solid brass, the binding posts being insulated therefrom with mica, so that no part of the retaining case of the transmitter, or any exposed portion, is connected with the circuit. The front of the transmitter is made from heavy brass of simple design, and accurately turned, and the back is made of heavy sheet brass.

Each transmitter bears a serial number followed either by the letter "C" or the letter "L." "C" is for central energy transmitter, and "L" for local battery transmitters. Every instrument is accurately measured for resistance and given a practical test on both short and long lines in comparison with other instruments, thus assuring that each transmitter has been properly assembled and received an accurate adjustment.

THE BAIRD MANUFACTURING COMPANY INVADES CANADA.

THE Union Telephone Company of Florenceville, New Brunswick, is installing the Baird secret service party line system which is rapidly earning a reputation throughout the United States as an "Anti-Rubbering" equipment that works. Correspondence received by the Baird people of Chicago indicates that Canadian companies are watching this installation with considerable interest, and the success which it is meeting elsewhere promises a large volume of business in Canada.

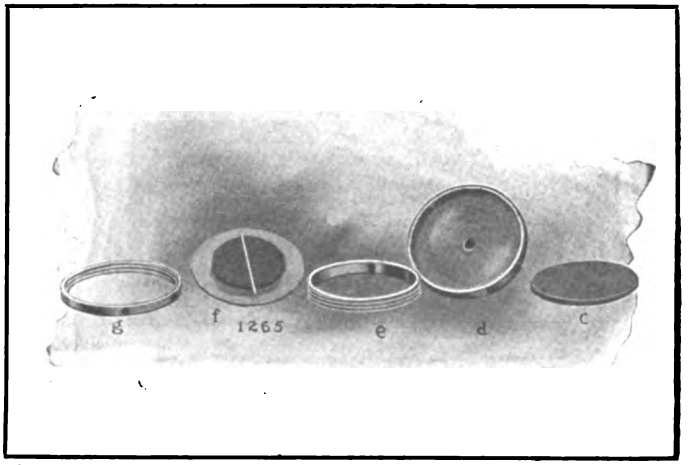

Fig. 6. Parts of cup of new transmitter designed by Stromberg-Carlson Telephone Manufacturing Company.

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THE WEEK'S MESSAGES

FINANCIAL.

BENSON, ILL.—The Jasper County Mutual Telephone Company has increased its capital stock from $10,000 to $25,000.

HEBRON, ILL.—At a recent meeting of the directors of the Farmers' New Era Telephone Company a dividend of 9 per cent. was declared on all capital stock issued prior to November 1.

PETERSBURG, ILL.—The Petersburg Telephone Company has increased its capital stock from $20,000 to $100,000.

TERRE HAUTE, IND.—The Citizens' Telephone Company has increased its capital stock, and will spend $200,000 in improving its system.

CRESTON, IA.—The Creston Mutual Telephone Company has declared its sixth annual dividend of 6 per cent.

HUDSON, N. Y.—The Columbia Telephone Company, of Hudson, has declared its fifth quarterly dividend of 1¼ per cent.

LANCASTER, O.—The Lancaster Telephone Company has increased its capital stock from $100,000 to $150,000.

FRANCHISES.

KING CITY, CAL.—F. J. Griffin has been granted permission to erect a telephone line from King City to Loneck and Priest Valley.

GALESBURG, ILL.—The Galesburg Telephone Company has applied for a perpetual franchise. It has recently increased its capital stock from $150,000 to $250,000; and, if granted the franchise will make extensive improvements in its system.

DOYLESTOWN, PA.—A franchise has been granted to the Standard Telephone Company, of Newtown, Pa., to construct and operate a telephone system in Doylestown.

COVINGTON, KY.—The Citizens Telephone Company has been granted a franchise in Covington.

NORTHAMPTON, MASS. The Citizens' Independent Telephone Company, of Williamsburg, has been granted permission to operate a telephone system in Northampton.

RENO, NEV.—J. H. Anderson, of Tulare, and W. D. Arnett and Lee Davis, of Reno, have applied for a franchise to operate an Independent telephone system in Reno. If the franchise is granted they will commence work at once.

ANGELICA, N. Y.—The Inter Ocean Telephone & Telegraph Company has been granted a franchise to build a toll and local line in Angelica. The new line will connect with the long distance line at Friendship.

CANASTOTA, N. Y.—Cordella Herrick, of Auburn, and R. J. Fish, of Oneida, are endeavoring to obtain a telephone franchise in Canastota.

ARDOCH, N. D.—A franchise has been granted to the Northwestern Telephone Exchange Company to operate an exchange at this place.

EAST GRAND FORKS, N. D.—The TriState Telephone Company is to apply for a franchise at East Grand Forks. This company is also to apply for a franchise at Crookston.

COMBINATIONS.

HUDSON, IA.—The Home Mutual Telephone Company has purchased from the Corn Belt Telephone Company a line extending from Hudson through the townships of Orange and Blackhawk.

PARSONS, KAS.—The Citizens' Home Telephone Company has acquired possession of all properties, franchises, and all other rights and emoluments of the Home Telephone Company. This merger embraces the exchanges at Parsons, Pittsburgh, Oswego, Chetopa, Altamont, Mound Valley, Edna and Bartley.

MILAN, MO.—The Milan Telephone Company has recently been purchased by the Sullivan County Mutual Telephone Company.

CHADRON, NEB.—The Chadron Mutual Telephone Exchange has been sold to A. W. Reikman, president of the Citizens' State Bank of Chadron. W. D. Burkett will have charge of the exchange.

DURAND, WIS.—The Durand Light and Power Company has purchased the Pepin Telephone Company's line from Durand to Arkansaw.

ELECTIONS.

QUINCY, ILL.—The Quincy Long Distance Telephone Company has elected the following officers: R. F. Spencer, president; C. M. Polk, vice-president; J. H. Murphy, secretary and treasurer, all of St. Louis. The company is rapidly completing arrangements for operations.

CRAWFORDSVILLE, IND. The Alamo Cooperative Telephone Company has elected the following directors for the year 1906: James Harwood, Wallace McClure, William Swearingen, Edgar Etter, Aaron Walter, J. B. Griffin, David S. Myers, Charles Pickett and Jesse Clore.

CLAY, IA.—The Northern Rural Telephone Company has elected the following directors: Harry Heikens, of Summit; Fred Jaynes, of Freeman, and J. C. Johnson, of Clay.

JOPLIN, MO.—Directors of the Joplin Home Telephone Company have elected officers as follows: Thomas Gary, Macon, Mo., president; John W. Lane, Joplin, vice-president; H. E. Scovern, secretary; Breckenridge Jones, chairman of the board of directors. The board of directors embraces in addition to the officers B. Jones, W. H. Warren and John W. Lane.

CROSBY CREEK, N. Y.—At a meeting of the Crosby Creek Telephone Company the following officers were elected: W. I. Price, president; Joseph Knapp, vice-president; F. M. Olin, secretary; Fred Olin, treasurer.

NEW COMPANIES.

BLACK SPRINGS, ARK.—The Black Springs Telephone Company, of Black Springs, has filed articles of incorporation.

ELGIN, ILL. A telephone company which will be known as the Turkey River Farmer's Telephone Company has been organized at Elgin.

GOLCONDA, ILL.—An Independent telephone company has been organized with the following officers: F. H. Rector, president; Jas. R. King, secretary and treasurer, and F. H. Rector, W. C. Cummins and Oren Threlkeld directors.

DILSBORO, IND.—The Dilsboro Telephone Company, of Dilsboro, Ind., has been incorporated with a capital stock of $1,000. Incorporators are: C. Wilson, H. P. Long, and others.

ALTON, KAS.—The Alton Mutual Telephone Company has been incorporated with a capital stock of $1,000.

DOUGLAS, KAS.—The Douglas Home Telephone Company has been incorporated with a capital stock of $5,000.

MAYFIELD, KY.—The Independent Telephone Company, which owns the Paducah Company, has filed articles of incorporation at Mayfield, Ky. The Mayfield company is to be known as the Mayfield Home Telephone Company. The amount of the capital stock is $50,000. The incorporators are J. C. Morteith, Bloomington, Ind.; J. H. Burgin, of Nantoit, Pa.; W. B. Stanfield, C. C. Wyatt and Leon Evans, of Mayfield, Ky.

HAMMOND, MINN. The Hammond Telephone Company has recently been incorporated. The company has an established exchange.

PROSSER, NEB.—An Independent telephone company known as the Farmers' Mutual Telephone Company has been organized. The following board of directors was chosen: David A. Hare, Robert Lomax, R. L. Wilson, Henry Uden and O. F. Creason.

JERSEY CITY, N. J.—Reliance Telephone and Telegraph Company. Capital stock, $125,000, all common. Registered office, 15 Exchange Place, Jersey City, N. J. Incorporators: Arthur Johns, Lanier McKee and Kenneth K. McLaren. The incorporaters are dummy directors. Field of operation unknown.

JERSEY CITY, N. J.—Eastern States Telephone and Telegraph Company. Capital stock, $10,000,000, all common. Registered office, 15 Exchange Place, Jersey City, N. J., field of operation not known. Incorporators: Henry A. Bingham, Cornelius A. Cole and Alexander F. Garbe.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies, and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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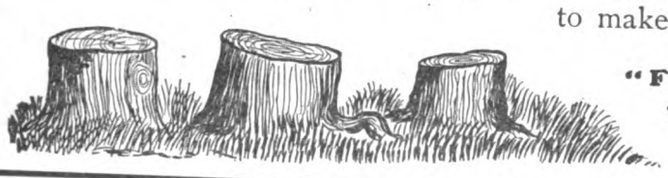
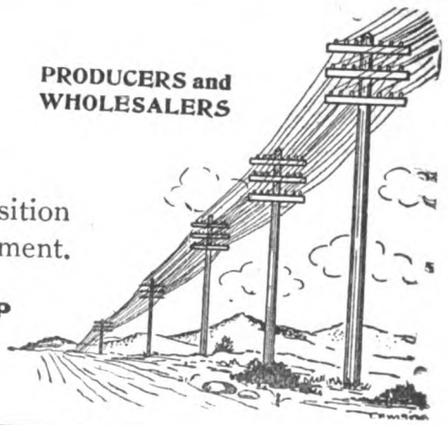


"From the Stump to the Line."



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THE WEEK'S MESSAGES

GLOVERSVILLE, N. Y.—The Independent Telephone Company, of Fulton County, Gloversville, N. Y., has been incorporated with a capital stock of $5,000. Incorporators: Frederick M. Young, Gloversville, N. Y.; William T. Briggs and A. Judson Baker, both of Johnstown, N. Y., and others.

HANNIBAL, N. Y.—The Hannibal & Martville Telephone Company, of Hannibal, N. Y., has been incorporated with a capital stock of $1,000. Incorporators: Bert Howland, Martville, N. Y.; Geo. Crofoot, Julius P. Rhodes, Hannibal, N. Y.

EDINBURG, PA.—The Rural Telephone Company, of Edinburg, has been incorporated with a capital stock of $5,000.

MILLER, S. D.—The Hand County Telephone Company has been incorporated with a capital stock of $10,000.

MONTGOMERY, TEXAS.—The Montgomery Telephone Company, of Montgomery, has been incorporated with a capital stock of $1,000. Incorporators: F. W. Peynghaus, M. S. Peynghaus and Robert J. Sullivan.

PERSONAL.

W. H. HAYES has been promoted to be district manager of the Canadian Bell Telephone Company for Manitoba, including the city of Winnipeg.

J. P. MASON, formerly manager of the exchange of the Iowa Bell Telephone Company at Fort Madison, has been promoted to a similar position at Keokuk, Ia.

E. O. RUPPERT has taken charge of the system of the Valley Telephone Company at Lebewaing, Mich.

B. H. SKINNER, who has occupied the position of assistant chief installer for the Western Electric Company, Chicago, is about to sail for Manila, P. I., where he will install a large common battery exchange for the Philippine Islands Telephone and Telegraph Company.

MISCELLANEOUS.

MERIDIAN, IDAHO.—The Independent Telephone Company has extended its line from Meridian to Kuna, and has established a toll station at that point.

DIXFIELD, ME.—The Northeastern Telephone Company has completed a new line from Wilton and Farmington, connecting with Portland.

TOLEDO, O.—The Toledo Home Telephone Company is very busy at putting in new private exchanges throughout the city. Among those, which are to be completed about the first of the year, is an exchange for the Wayne Hotel, a board connecting about 140 rooms. A private exchange is being put in at The Tavern, which will connect up about 70 rooms. A private exchange is being put in for R. A. Bartley, the wholesale grocer. The Y. M. C. A. building is being furnished with two trunk lines and 15 sub-stations. A new exchange was installed last week for the Toledo Press, three trunk lines and a dozen sub-stations being provided. Work will begin after Jan. 1st to install a private exchange, which will connect the 36 school buildings of the city. The central high school building will be provided with 6 sub-stations.

COLUMBIA, WASH.—The Citizens' Telephone Company, of Columbia, has been organized for the purpose of supplying the town of Columbia, and the suburban districts as far as Renton, with telephone service.

New Construction in the Field

MOBILE, ALA.—The Home Telephone Company has begun the work of putting 300,000 feet of cable under ground. It is estimated that fully $350,000 will be expended by the company on its local plant, as well as its long distance connections between Mobile and Baldwin counties. In addition, the company is building a modern exchange on Conception street. Switchboards are to be put in, making provision for additional subscribers.

PARIS, ILL.—The Wabash Valley Telephone Company is to thoroughly inspect its system, and make extensive improvements at its several exchanges. In a short time the Bell telephones of the local system will be replaced with the Kinloch central energy telephones. The contract with the Bell Company, which expires in about a year, will not be renewed.

BADGER, IA.—The Badger Telephone Company is to construct a number of rural lines.

BURLINGTON, IA.—The Jefferson County Telephone Company has recently completed a toll line to Burlington. It is expected that connection will be made to Monmouth, Galesburg, and about 150 other towns in western Illinois.

MADRID, IA.—The Madrid Ice and Telephone Company will put in a new switchboard at its exchange.

HEATH, MASS.—The Heath Telephone Company is extending its lines from Hawley to Watson and Spruce Corner.

BELLAIRE, MICH.—The Traverse Bay Telephone Company is to put in a new switchboard. The company's lines will connect at Acme with the Citizens' line.

VERMONTVILLE, MICH.—The Citizens' Telephone Company is extending its lines and installing new telephones. It is its intention to transfer the Kalmo exchange to the local exchange.

AKELEY, MINN.—The Red River Lumber Company will extend its telephone line to connect with the Solway line at Squaw Lake.

ATTICA, N. Y.—The Attica Home Telephone Company has commenced the installation of its system under the franchise recently granted.

BAITING HOLLOW, N. Y.—The lines of the North Shore Telephone Company, and the Baiting Hollow & Roanoke Telephone Company have been connected at Wading River, and local service is thus extended to Fort Jefferson and Patchogue.

CHENANGO FORKS, N. Y.—The Chenango Valley Telephone Company is constructing a line from Chenango Forks to Triangle.

FALCONER, N. Y.—The Home Telephone Company, of Jamestown, is about to install a telephone exchange at Falconer.

GREENWICH, N. Y.—The Commercial Union Telephone Company, of Schuylerville, is to install a telephone system in Greenwich.

PITTSTOWN, N. Y.—The Pittstown Telephone Company is to build a trunk line to connect with the Johnsonville Telephone Company.

SENECA FALLS, N. Y.—The Home Telephone Company proposes to extend its line to Interlaken.

SOUTH APALACHIN, N. Y.—The Cindirilla Telephone Line is now complete from Friendsville to South Apalachin. The company expects to extend its line to Apalachin and Binghamton.

ASHEVILLE, N. C.—The Asheville Telephone Company is to soon commence the construction of its underground system in Asheville.

AKRON, O.—The Peoples' Telephone Company will spend $75,000 in erecting a new building and installing a new plant at Akron, O.

COLUMBIANA, O.—The Columbiana County Telephone Company is extending its lines to take in Ross Meadows, Cannon's Mills and vicinity.

EUGENE, ORE.—The Edenvale Telephone Company is constructing an Independent telephone line from near Pleasant Hill to Springfield. R. J. Hemphill is president of the company.

BIRDSBORO, PA.—John Rothermel, Irvin High, George Reichey and Joel Reiter are prime movers in the construction of a telephone line from Birdsboro to Stonetown and Reading.

DOYLESTOWN, PA.—The Keystone Telephone and Telegraph Company has begun work installing the system in Doylestown, and will have a line working to Philadelphia by spring.

NEW LEXINGTON, PA.—Mr. C. B. Moore, of New Lexington, is having a line built from New Centreville to New Lexington, where it will connect with the Somerset Telephone Company's lines.

TERRELL, TEXAS.—The Flashlight Telephone Company's system has been installed in Terrell, and the old telephones are being replaced with new ones.

INWOOD, W. VA.—The Inwood Rural Telephone Company has been granted a franchise, and will construct and operate a line in the southern part of the county.

WHEELING, W. VA.—The National Telephone Company, Wheeling, is to install two new telephone exchanges in the Wheeling district. Plans are also under way for the erection of a new exchange building at Warwood, where Woodland, Loveland and Glenova will be connected.

The company is also extending its lines from Pleasant Valley to West Alexander, Pa. At the latter place they will connect with the system of the Claysville Telephone Company, which has a large number of subscribers in Washington County.

SONORA, MEXICO.—The congress of Sonora has approved the contract executed between the executive and Llanos de Oro Company, S. A., for the construction of a telephone line from Sonora to the El Bolulo mining camp.

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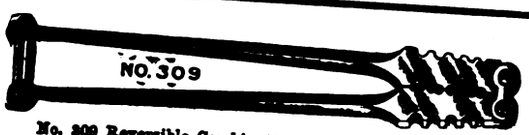

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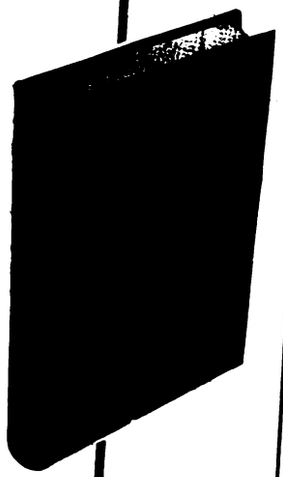

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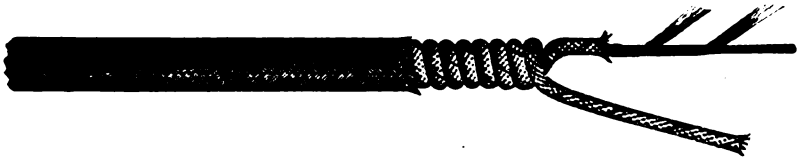

This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

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Commercially, there are many grades and degrees of temper in German silver, but that used by "NORTH" is made and tempered from a special formula obtained by years of practical experience. In 100 lbs. of German silver there are 60 lbs. of copper, 18 lbs. of nickle and 22 lbs. of zinc. The copper and nickle are melted together and the zinc separately; for the temperature required to melt nickle and copper would destroy the zinc. The whole is mixed in a molten state and cast into slabs one-half inch thick and reduced cold to the desired gauge by a succession of rolls. During the process it must be softened at each reduction of 10 gauge numbers by heating and plunging into water; for the metal is tempered naturally by roll pressure. (Contrary to steel, German silver, like copper and brass, is hardened by allowing to cool slowly, and softened by heating and cooling suddenly.)

The degree of temper desired is regulated accurately by the period of softening previous to its passing through the last roll for its final reduction. For instance No. 24 gauge is softened for the last time at No. 14 gauge. If a German silver of less temper is desired than that used for contact springs, it is softened at No. 18 gauge.

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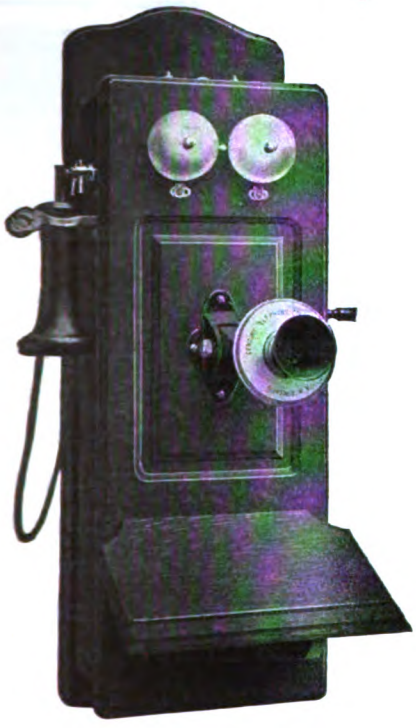
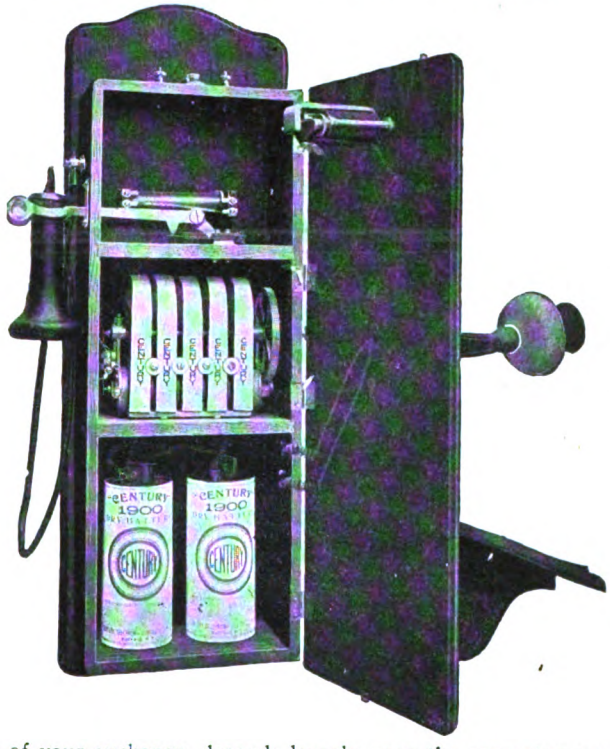
MAGNETO TELEPHONES





The quality of your service, also the earning power of your exchange, depends largely upon the apparatus you are using.

Therefore, is it not good policy to use nothing but the very best apparatus?

Our No. 65 magneto telephones will give your subscribers the very best service. Their use will also increase your dividends by reducing to the minimum your maintenance charges.

Our No. 65 magneto telephones have been carefully developed and perfected to such an extent that they can be relied upon for perfect service at all times.

These telephones are made up in all the different types, for all classes of service.

You may make a thorough test of these telephones; we will send you one or two series bridging instruments on 60 days' trial, charges prepaid.

Don't you think this offer is worth considering? Send us an order.

CENTURY TELEPHONE CONSTRUCTION CO.

332 ELLICOTT STREET

BUFFALO, N.Y.

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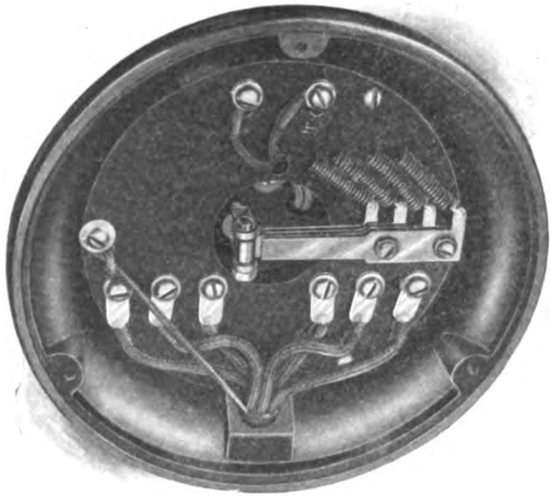
MONARCH APPARATUS

THE DESK SET



All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 10-16 SOUTH CLINTON STREET CHICAGO, ILL.

BE AS HONEST

with yourself as we are in the manufacture of *International* Apparatus. Give us the opportunity of estimating on your next order for telephones or switchboards. Recent installations in the U. S. and Foreign Countries are convincing.

International Telephone Mfg. Co.
HARRISON AND CLINTON STS.
CHICAGO, ILL.

BELDEN SILK MAGNET WIRE

is put up ONE PIECE ONLY per spool.
The insulation is absolutely UNIFORM, CONTINUOUS, and of CORRECT THICKNESS.
Our prices are LOW and CONSISTENT with the cost of manufacture of each size.
We have 20,000 pounds of fine sizes of wire IN STOCK for immediate delivery.
1906 CATALOG of WIRE and CORDS is now out.

BELDEN MANUFACTURING COMPANY
194 MICHIGAN STREET
CHICAGO

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DEAN TELEPHONE APPARATUS

"There Must Be a Reason."

Efficiency

We have continually talked efficiency in advertising our apparatus—the efficiency that means a dollars and cents saving in operation and maintenance.

This efficiency has been the means of our continually increasing business—business from the most conservative and skeptical buyers.

Our magneto and local battery apparatus will help to pay your dividend and at the same time will give you pleasure in operating your exchange—the pleasure of not having excuses to make for poor service.

It will pay you to try the celebrated Dean product in your new year's construction.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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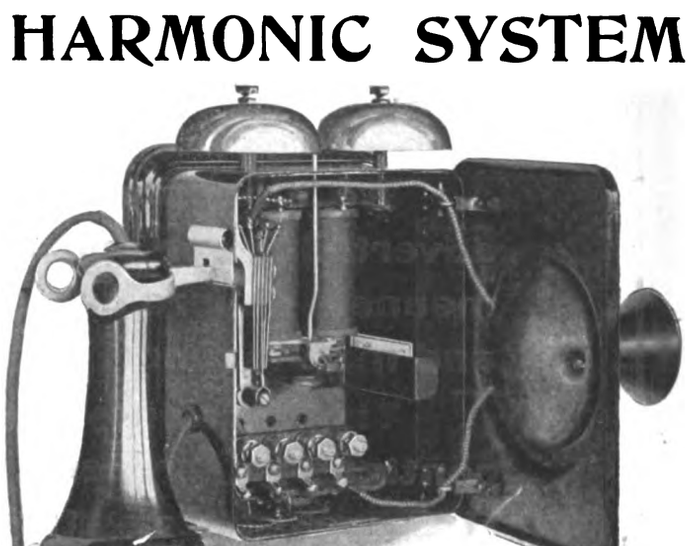

"OPEN"

ADVANTAGES

They will NOT warp, crack or fall to pieces.
HEAT or MOISTURE will not affect them.
They can be enameled in any desired color—standard being black.
All binding posts and connections are CONCEALED.
They are the most COMPACT TELEPHONE made.
DURABILITY, HIGH EFFICIENCY, UNIFORMITY, MODERATELY PRICED.

Send for the "LITTLE RED BOOK" which tells you all about them.

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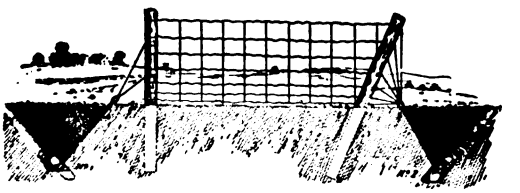

"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

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Wire, Cross Arms, Pins

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Highest Grade Lowest Prices Quickest Delivery

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Insulated Electrical Wires and Cables

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Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

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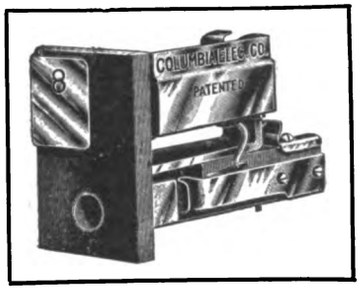
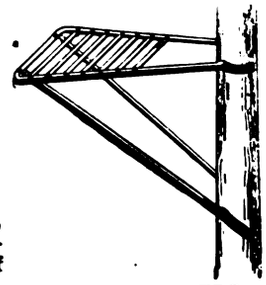


Drops Self-Restoring. Fits Eureka Board. Heavily Nickel-Plated. Guaranteed Wound True to Resistance, with Best Silk-Covered Magnet Wire. Series, $1.50. Bridging, $1.75. Ringing Keys with Platinum Contacts. Also Telephones Guaranteed for Five Years.

COLUMBIA ELECTRIC CO.
McCORDSVILLE, IND.

Security Pole Seats .



Cost Less.
Weight Only 28 Pounds.
Tested to 1,000 Pounds.
Will Carry a Ton.

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SECURITY POLE HOUSES—DISTRIBUTING PANELS—CROSS CONNECTING PANELS—FUSES—POLE DISTRIBUTING RINGS—BRIDLE RINGS—POLE LADDERS AND PLATFORMS—ALLEY BRACES—TROLLEYS—MESSENGER CARS, ETC. Special Prices on Large Quantities.

Novelty Slidable Sleeves

THE CHEAPEST, QUICKEST AND SIMPLEST DEVICE MADE FOR SPLICING CABLES, FOR STRAIGHT-AWAY AND Y SPLICES.

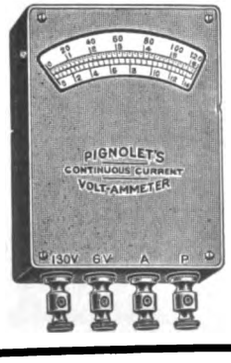
TOLEDO, OHIO
THE F. BISSELL COMPANY

Can be inspected any time without injury to, or waste of cable, and without expense. Air and water proof after inspection, same as before.

Write for Bulletin for complete information and prices.

THE F. BISSELL COMPANY,
TOLEDO, O.

THE VALUE OF A MEASURING INSTRUMENT



Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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Do You Know What She Costs?

"RUBBERING"

AND HOW TO~ STOP IT~

And how much you could increase your party line business if it was known your lines were free from this annoyance.

DO YOU REALIZE

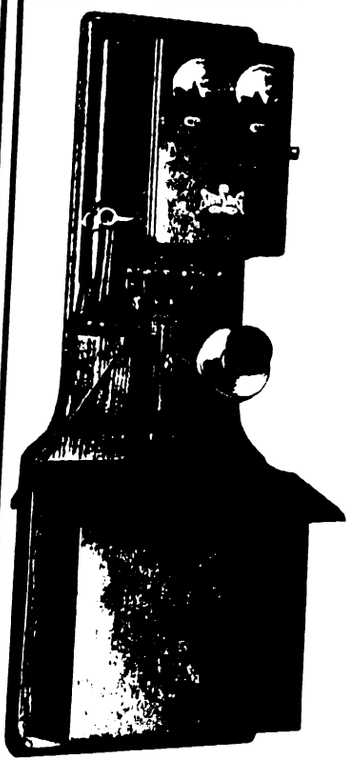
How much she cuts down transmission?

WILL YOU LET US TEACH YOU

How to get rid of her AT OUR EXPENSE?
Then write for our Booklet.
We can easily prove to you that

EVERYTHING WE MAKE MAKES MONEY.

Baird Manufacturing Co. 6 Michigan St. CHICAGO



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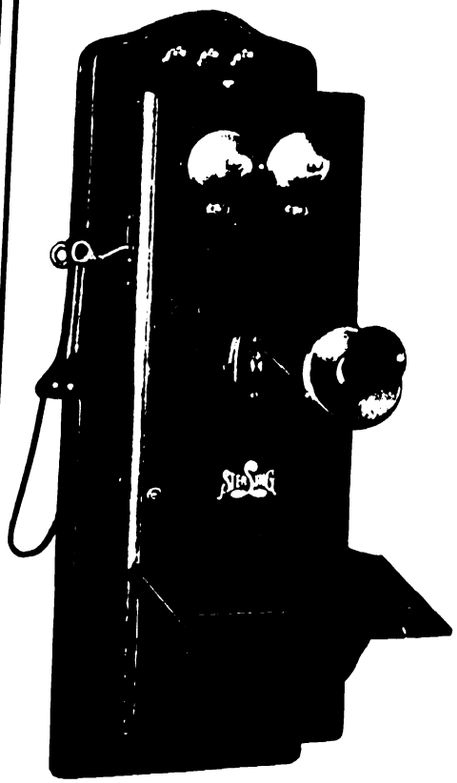

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AUTOMATIC INTERCOMMUNICATING 'PHONE for EXCHANGE CONNECTION

EXTREMELY SUCCESSFUL.
NON-INTERFERING TRUNK BUTTON.
HARD RUBBER CONNECTIONS.
SWITCH NOT DEPENDING ON GRAVITY.
FOR COMMON OR LOCAL BATTERY EXCHANGES.
ABSOLUTELY NON-INTERFERING.

CONNECTICUT TELEPHONE & ELECTRIC CO.
MERIDEN, CONN., U. S. A.

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To Confirm Our Claim "Rapid Operating"

The letter below proves the above claim which we made in the last issue of this paper.

EL PASO TELEPHONE CO.

EL PASO, Ill., September 20, 1905.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

GENTLEMEN:—Replying to your inquiry, regarding our Generator-Call Visual Signal Switchboard, will say that the same has been installed a little over two years and has given perfect satisfaction. The best explanation as to its rapidity will be shown in the fact that never more than two operators are at the board during the busiest hours. We have 325 Phones installed in the city and 38 country lines on which we have 350 subscribers, making a total of 675 people whose calls are attended to, with little effort during the busiest hours by two operators.

We think this is the best recommendation we could give your board. We have had very little trouble in keeping the board in perfect condition and we can gladly recommend it.

Truly yours,
A. E. FLEMING, Mgr.

Next week we expect to tell you what the user has to say about *Maintenance*.

If you are going to put in a Generator Call Equipment, you could not improve upon this type of equipment.

Let us quote you prices.

Have you received a copy of our booklet No. 91-B, describing our new transmitter?

Stromberg-Carlson Telephone Mfg. Co.

GENERAL OFFICE
ROCHESTER, N. Y.

BRANCH SALES OFFICE
CHICAGO, ILL.

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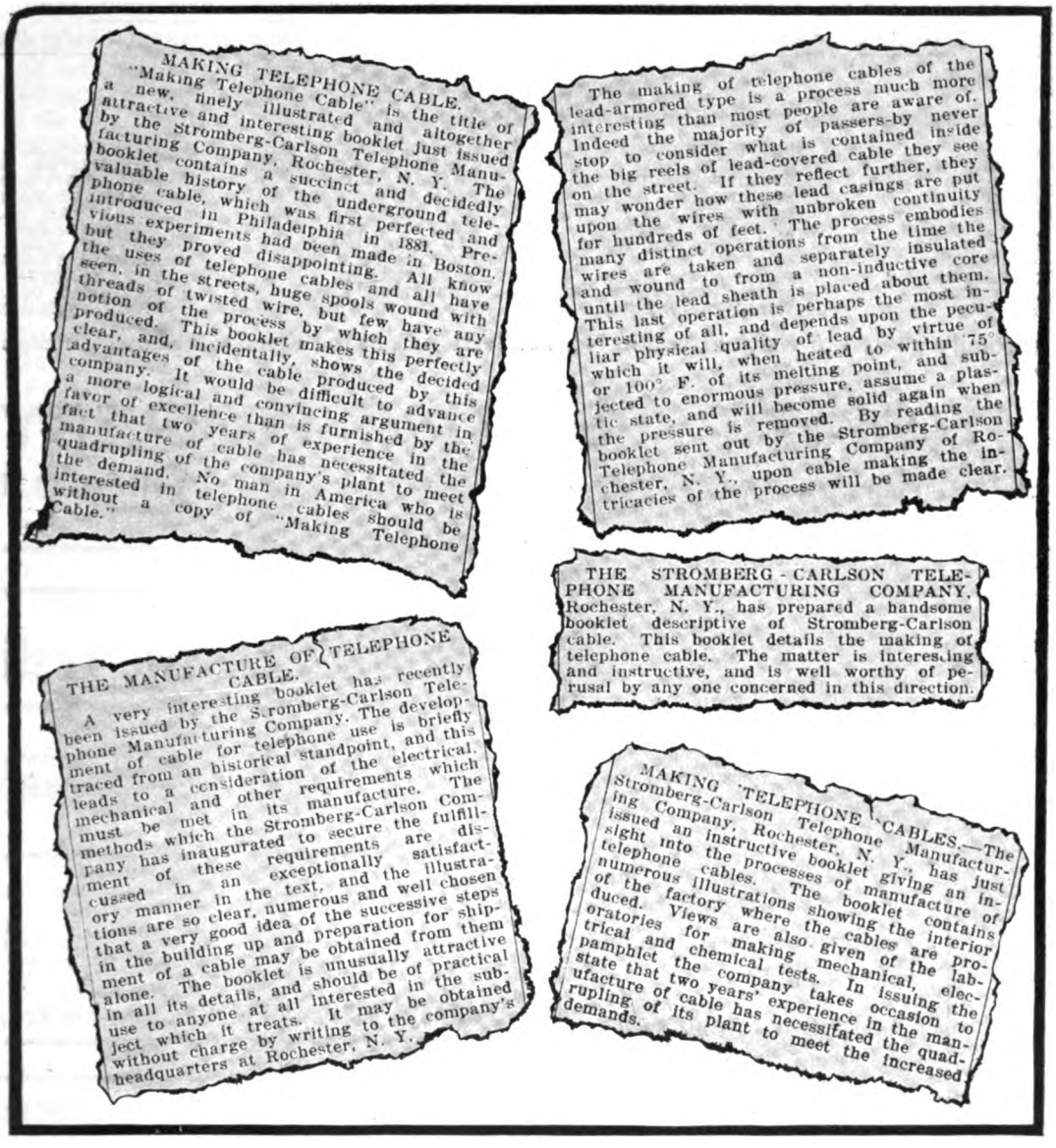
WE MAKE CABLE

YOU SHOULD HAVE A COPY OF THIS BOOK



It Will Post You How to Buy Telephone Cable

WE MAIL IT FREE

Ask for Booklet No. 79-B.

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past two years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.	SOUTH BEND, IND.	ALBUQUERQUE, N. M.	WESTERLY, R. I.
GRAND RAPIDS, MICH.	ABERDEEN, S. D.	TRAVERSE CITY, MICH.	MANCHESTER, IA.
COLUMBUS, OHIO.	MIAMISBURG, OHIO.	AUBURN, MAINE.	PRINCETON, N. J.
DAYTON, OHIO.	LOS ANGELES, CALIF.	FALL RIVER, MASS.	RIVERSIDE, CALIF.
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SIOUX CITY, IOWA.	PENTWATER, MICH.	HAZLETON, PA.	HAVANA, CUBA.
CLEBURNE, TEXAS.	TORONTO JUNCTION, CANADA.	WOODSTOCK, N. B.	MARIANAO, CUBA.
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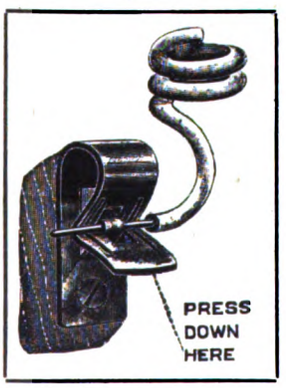
You are cordially invited to visit our booth, No. 20, Section C, at the Electrical Show, Chicago Coliseum, January 15-27.

AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

ISN'T IT

just as important to have high efficiency in the matter of the connectors that are used to take the current out of a dry battery as to have high efficiency in the current generating qualities of the cell itself?



If you believe this, and we see no grounds for an argument, then you should have

FAHNESTOCK SPRING BINDING POST

on your dry batteries.

Why run a chance of counteracting the electrical efficiency of your battery by a poor connector, especially when you can have the best by merely asking for it?

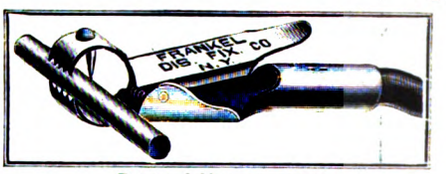
If you want to be shown just write us and remember that you can get Fahnestock spring binding post on any make of battery.

Fahnestock Electric Co.

132 Havemeyer Street, Brooklyn, N. Y.

SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.

Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
Lots of 100.....11.00 per 100 Lots of 1000..... 9.00 per 100

GET out of that rut of skinning the wires—IT'S EXPENSIVE. THIS device will save both valuable time and material—THAT'S PROFIT. The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

FROM YOUR SUPPLY HOUSE, OR

FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

SEE THAT SCREW?

THE BLACKBURN GROUND CLAMP

For Connecting Ground Wires to Pipes, Rods or Cables

Patented

In the BLACKBURN GROUND CLAMP, the turning action of the screw on the pipe while being attached secures a clean contact, thereby saving the time usually spent in cleaning the pipe. This connection is equally as good as the average soldered joint and does not cost one-fourth as much.

GEO. R. BLACKBURN

CLEVELAND, OHIO

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries, $3.00 a year.

The American Telephone Journal

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VOLUME XIII *SATURDAY, JANUARY 13, 1906* *NUMBER 2*

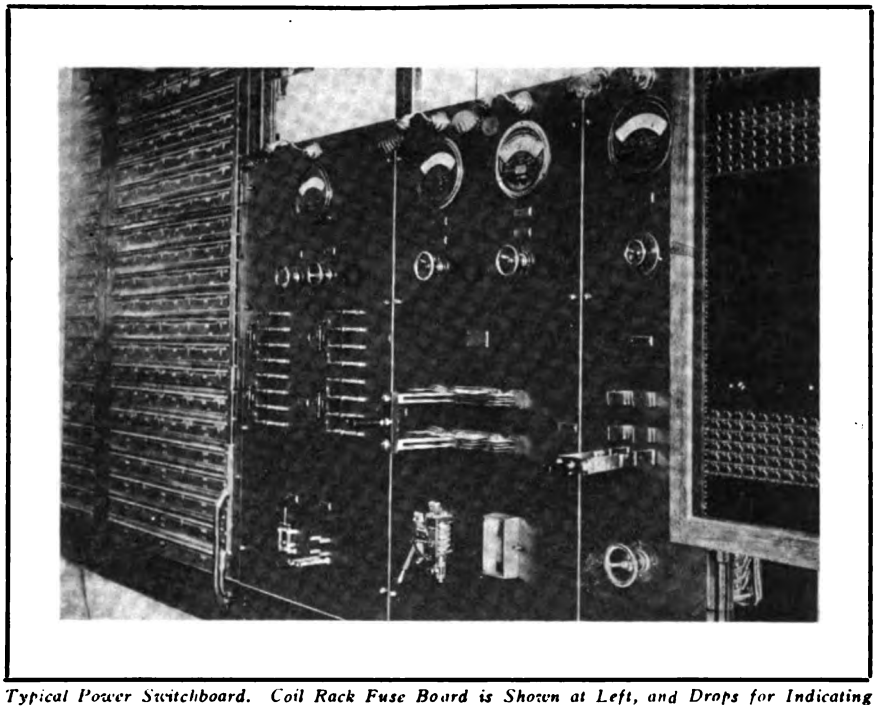
Power Installation*

By Arnold F. Pierce.

With plates in position and attached to bus-bars, it remains to fill the cells with acid solution. This is made of water and sulphuric acid, the latter being about eight or ten per cent, of the volume of water. Pure, distilled water is advisable for solution purposes, and the acid used should be of good quality. The solution may be obtained ready mixed from supply houses, and will be found to be of proper strength, reading about 1,200 degrees on the hydrometer. If desired, the solution may be made by adding the acid to distilled water until the proper specific gravity is reached. Care should be taken in mixing; the acid must be poured slowly into the water, and never the water into the acid, and the water should be agitated during the mixing process. As considerable heat is evolved, earthenware or lead vessels are preferable to glass for the purpose.

Rules and data upon charging the cells are furnished with the battery, and, of course, the amount of current used is dependent upon the size, or capacity of the installation. The machine voltage is always set higher than the battery potential, though the margin is only four or five volts with the usual 30-volt generator. The battery is charged continuously for from forty-eight to fifty-two hours, and then allowed to discharge for a given period through a given resistance, the data for the rate of charge, etc., being given by the supply companies to cover the requirements of the special case. After charging and discharging the specific gravity of the solution will be found to be lowered, and is brought up to the stated standard by adding fresh solution. The solution should cover the tops of the plates by half an inch or more.

For the systems in common use there are two standard battery voltages. While 24 volts has been almost universally adopted for local telephone circuits, a pressure of 48 volts is frequently used for the cord circuits of toll and long distance equipment, and an extra set of cells is used, to work in tandem, or series with the main office battery. These cells are smaller, and of less current capacity than the main set, and can be set along the wall on shelves in the battery room, or upon a special battery stand.



Typical Power Switchboard. Coil Rack Fuse Board is Shown at Left, and Drops for Indicating Rupture of a Fuse in Line Relay Leads at Right.

Whenever possible, a separate room should be assigned for battery purposes, as the fumes from the cells are acid in character and will corrode metal work with which they come in contact, besides being detrimental to the health of those working in their vicinity. If inconvenient to place them out of the power room, they should be boxed in with a casing permitting easy and ready access to each or all the cells. This encasement should be provided with a leaden vent pipe of sufficient diameter to allow the gases to escape to a flue or chimney. The vent pipe should have no square corners; the elbows should be well rounded, and, as stated, the pipe should be of lead to resist the corrosive action of the fumes. If possible to set aside a separate room for the batteries, it should be well provided with ventilation and of an even temperature. The battery fuse-panel should have all metal parts thoroughly painted with asphaltum, or other heavy paint, and all brass lugs on the battery should be so treated, to prevent access of the fumes to connections and mountings. If iron conduits are used for carrying the leads, they should be thoroughly painted, as well as the insulation of the leads themselves. Too great precaution in this matter cannot be taken.

It is customary to cover the tops of the individual cells with plates of heavy glass or rubber, to prevent foreign matter from falling into the cells. All woodwork of tanks and supports should be frequently examined for leaks, and should be kept dry and painted at reasonable intervals with asphaltum paint.

A device for use in connection with the batteries which is of great convenience to the wire chief is frequently installed on the power-board. It consists of a switching apparatus, which, by the turning of a handle provided with an indexed pointer revolving over a marked dial, will give a reading of the voltage of each individual cell of the battery, a reading of the voltage of the entire string and of the generator voltage. The volt meter used in connection with this switch has two scales, one reading one to forty, and the other one to three or four. This voltmeter and switch affords a quick and convenient method of locating any faulty cells.

Frequently only a single ammeter is provided, this being connected to the middle points of a double-pole double-throw knife

*Continued from the issue of January 6th.

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switch which can be thrown in one direction or the other to obtain a reading on the charge, or discharge lead, or to give the current passing through the lead connected to either battery, when the double battery system is used.

A suggestion has been offered and is being put in operation by some exchanges, in regard to placing recording ammeters in the charge and discharge circuits. By means of this apparatus a record may be kept of power expended and consumed in the operation of the plant. With such a method of regulation it would seem possible to obtain excellent data, both as to expense and efficiency of the power apparatus, and, furthermore, to assist in using discretion in the matter of the amount of charging current for the batteries.

From the battery fuse panel shown in the circuit of a previous article, it will be noticed that the discharge lead goes directly to the fuse panel. Referring to Fig. 5 of this article, a view of the fuse panel is shown. It consists of a heavy panel of slate, within a frame of angle-iron and placed adjacent to the repeating coil racks. Upon its face are placed the fuse mountings, and on the rear the lugs for the leads to repeating coils and other switchboard circuits. In the figure the vertical bus-bar to the lift is connected by means of a lug to the negative battery lead at "L." The horizontal strips are provided with set screws, as are the lugs above them. Fuses of the proper capacity are placed between these points, and beneath the rows of fuses lie the small fuse alarm strips. Each horizontal row is provided with a signal lamp, which will be spoken of later. It will be noticed that a portion of the panel is equipped for 48-volt battery, which is furnished by a special bus-bar, on the rear, and a separate battery lead from the terminal of the string of small cells. These bus bars carry only the leads for supplying battery either to toll operators' cord circuits, or to toll switching operators' cord circuits, dependent upon the type of switchboard in use. Where the average length of subscribers' loops is short no 48-volt battery is provided in the exchange.

The fuse panel as portrayed is merely intended to give the reader an idea of its purpose, as the arrangement of distributing leads is optional with the interests served in the exchange.

The segmented bus-bar at the top is designed for the wire

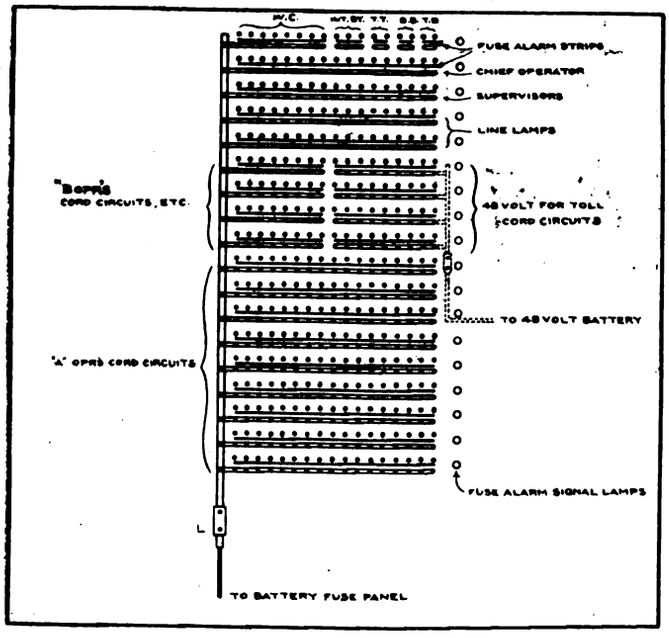

Fig. 5. Typical arrangement of bus bars and terminals for leads to switchboard and alarm signals.

chief's table, and the ringing and tone circuits. As the bus-bar for the latter is not always at battery potential, the upper bar is broken to accommodate this service.

The second strip feeds the chief operator's desk, its cord circuits, signals, etc. Further down is the strip for the supervisor's equipment, then the line lamps, etc. In this diagram are shown sections of the fuse board devoted to leads from 48-volt battery as well as for the "B" operator's positions, and lower the battery for the "A" operator's repeating coils. Below the transmitter feeds are shown, and the pilot lamps, and relay bays. No effort has been made to describe or illustrate a working panel, only to give an idea of the arrangement.

In the most recently installed offices of this type no separate

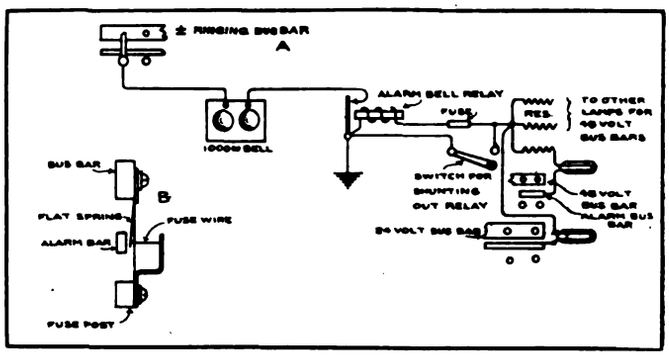

Fig. 6. Alarm circuit for indicating operation of fuse, and type of fuse used with this circuit.

bus bar is provided for line lamps, and other apparatus on the switchboard. The cable which carries the leads from the cord terminals to the repeating coils contains a number of wires, usually of No. 16 B & S gauge, which are extended beyond the repeating coil rack to the fuse board. Here they are connected to terminals in regular order with the leads which convey battery current to repeating coils. In this manner a single cable is made to carry nearly all the wires from the repeating coil rack and fuse board to an individual switchboard position.

When such a number of fuses are used, it is obvious that some quick method must be arranged in order to notify the attendant when and where a fuse opens. This has been provided for by setting a pilot lamp at the beginning of each fuse strip, and arranging that this will light up to designate the strip; and as the attendant may be in some other part of the building, an audible signal shall also be given.

In Fig. 5 is shown the small fuse alarm strip between the bus bar and the fuse mountings. A special form of fuse is used (see "B" in Fig. 6), which, when ruptured, or opened, drops the flat spring against the alarm strip, thus throwing battery from the bus bar to the alarm strip, thence (Fig. 6—A) through the alarm lamp signal, lighting it. From the lamp the current passes to ground through the low-wound relay "R." The operation of this relay puts ringing current through the bell to ground on the relay armature.

A fuse is provided in the battery relay circuit, and a jack-knife switch for shunting the relay when attention has been obtained.

When the alarm strip is segmented, as in some rows, the strips are strapped by jumpers on the back of the panel.

Various plans for indicating the location of an open fuse have been devised, of which the one described was for a long time the most satisfactory. An objection to its use which was raised, however, is due to the fact that although the bus bar on which the trouble occurs is indicated it requires a careful search to determine which fuse on the bar has blown. To meet this condition a fuse was devised in which the rupture of the fuse wire not only releases a spring beneath the bar for completing the alarm circuit, but also permits a spiral spring, mounted upon the face of the fuse, to operate and bring a white glass bead indicator, fixed to an extension of the spring wire, into a position where it is easily visible. In this manner the operation of any fuse automatically calls the attention of an attendant, even though he may be in a distant part of the room, to the fuse board. On reaching it he is able to determine at a glance which circuit is in trouble, and commence at once the investigation necessary for clearing the trouble.

(To be continued.)

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Telephone Exchange Engineering

By Ray H. Manson, Chas. A. Simpson and Albion D. T. Libby.

Article XXIII. The Switchboard Layout.

It is always a great puzzle for the beginner in telephony to understand how it is possible for each operator at an exchange to be able to connect any subscriber with any other subscriber in the same exchange.

By referring to Figs. 102 and 103, it may be easily understood. One must remember that the part of the exchange at which the operators work is made up of several similar divisions, called sections. These sections, when fitted together, give an appearance of one continuous piece of framework. For convenience, a double line has been drawn to indicate the dividing line between the different sections. While the drawing does not show it, yet it must be remembered that section three is located immediately to the right of section two, section five at the right of section four, and section seven at the right of section six. The number of the section is shown immediately below in each case.

It will be noticed that the answering jacks and lamps are located in the lower portion of the face of the sections. The first strip of jacks is usually placed about three inches from the plug shelf which is represented by the lower line of the equipment drawing. The strips of answering and lamp jacks are located alternately, one above the other. Some manufacturing companies locate their lamp jacks immediately below the corresponding answering jack, but in the equipment, as shown, the lamp jacks are immediately above the corresponding answering jacks.

The lamp jacks in each panel are numbered from 0 to 49, individual jacks being numbered, however, instead of the end jacks of the strip, as shown in the drawing.

Each answering jack has a removable, interchangeable number plate. These number plates are stamped with numbers from 0 up to the number of lines there may be in the exchange which, in this case, is 1,799. These number plates designate the telephone numbers of the subscribers, and are made removable so that the traffic manager can arrange the lines so that the number of incoming calls will be evenly distributed amongst all the operators. In doing the latter it becomes necessary to disconnect a subscriber's line from an answering jack at one position and connect it to another located in front of a different operator. As it is always desirable that each subscriber shall keep the same number originally assigned him, the removable number plate is used, and transferred to the new jack at the time the line is changed. The actual operation of changing a certain subcriber's incom-

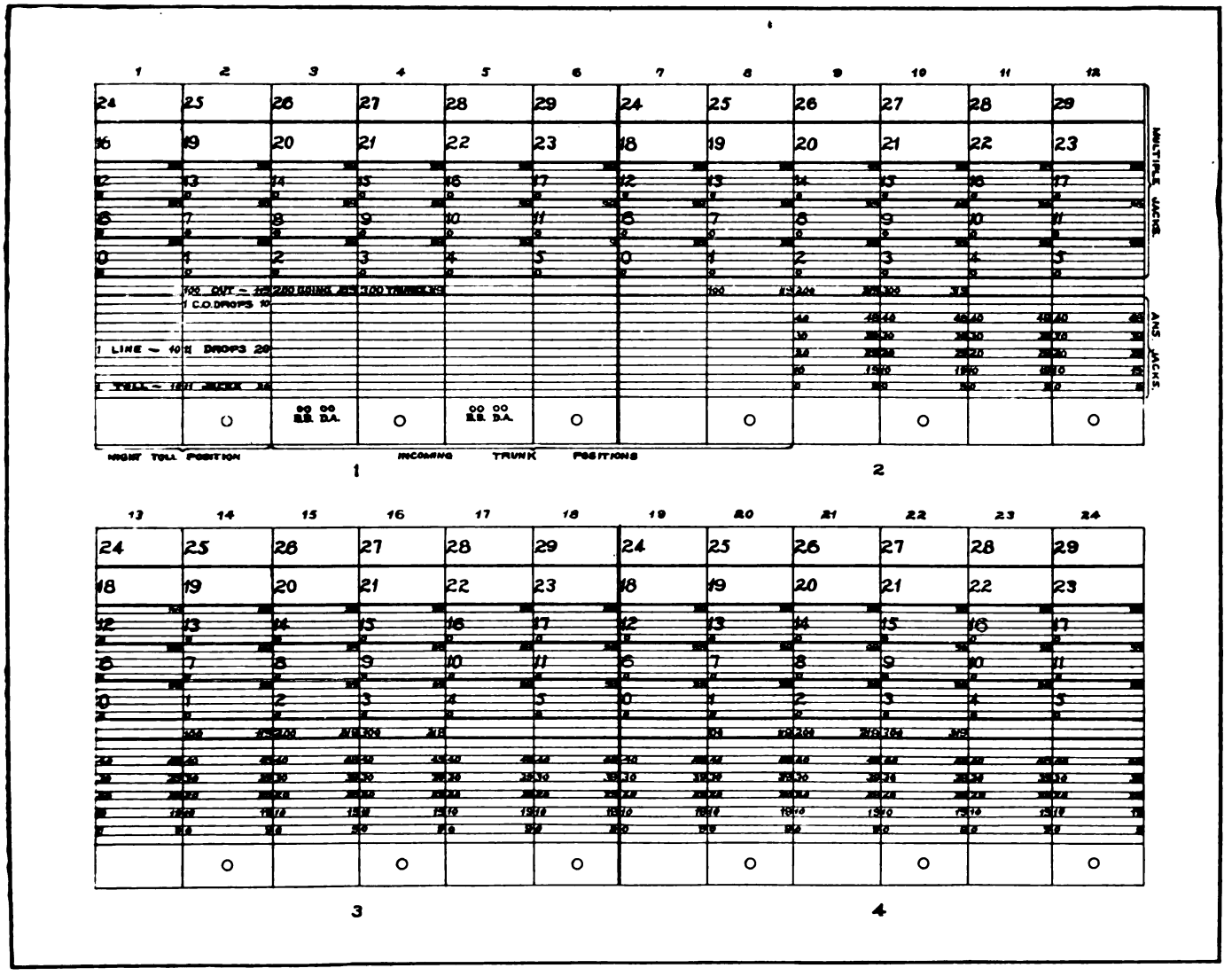

Fig. 102. Jack equipment, section 1, 2, 3 and 4 of the "Example exchange" common battery multiple switchboard.

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ing calls from one operator's position to the other is accomplished by means of an "Intermediate Distributing Frame," and will be taken up fully under that heading.

It is always desirable to leave extra room for additional answering and lamp jacks at the top of the answering jack space of each panel of the multiple switchboard, as it may become necessary at some future time to add more lines to some operators in order that they may be kept as busy answering calls as the average operator. Owing to this fact, there are exchanges in operation with only forty subscriber's lines in some positions, while at adjacent positions there are one hundred and sixty.

The line pilot lamps are located in the space below the answering jacks. This space is covered with leather to prevent the plugs from marring the sections.

The outgoing trunk jacks are located immediately above the answering jack space. These jacks may be trunks to one exchange, or several, as the case may be. Immediately above each strip of jacks, a designation strip is located on the face of which is a piece of paper protected by a piece of transparent celluloid. On this paper are written the names of the exchanges at which the jacks immediately thereunder terminate. The outgoing trunk space is clearly separated from the other equipment by means of a thin white holly strip above and below.

Just above the outgoing trunk jacks are located the multiple jacks. These are grouped in banks of five strips of twenty jacks each, each group being separated from the one above by thin white holly strips, as shown in Fig. 107. Each group of jacks is numbered from 0 to 99, and each jack in each group has a permanent number stamped on the rubber mounting with the exception of the 5th, 10th and 15th jack of each strip. Instead of numbering these three jacks, there are two small white dots, one above the other at the side of the jacks. It will be seen that these white dots re-divide the bank of five strips into squares of five jacks each way. These dots enable the operators to more quickly pick out the number of the multiple jack corresponding to the subscriber who is to be called.

On the stile strips which divide the sections into panels are located ivory number plates with engraved figures filled with black enamel. These number plates designate the hundreds and are located at the left and in the center of each group of five jacks. These numbers are duplicated in each section.

The "busy back" and "don't answer" jacks for the two incoming trunk positions are located just below the answering jack space.

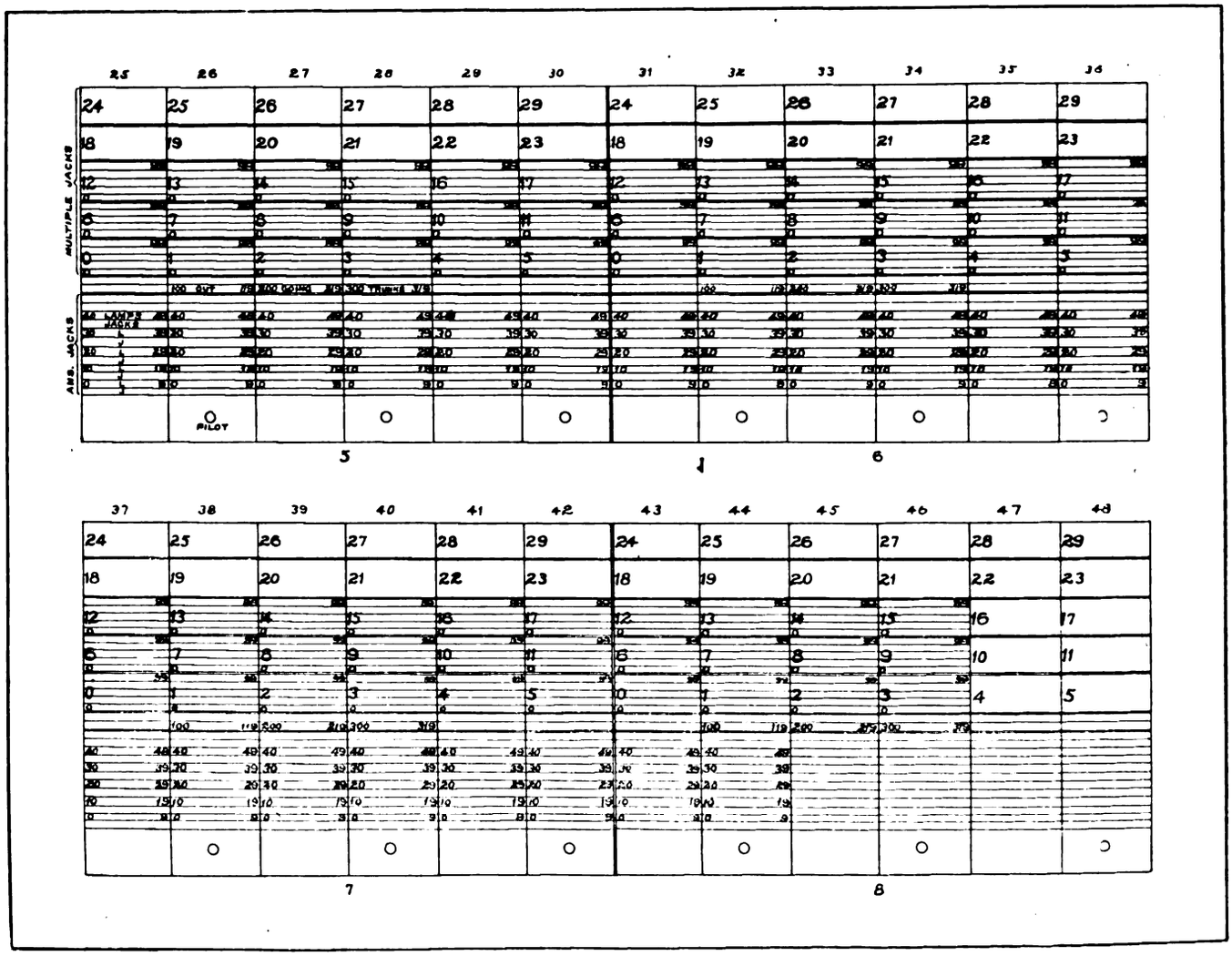

Fig. 103. Jack equipment, sections 5, 6, 7 and 8 of the "Example exchange" multiple switchboard.

The first position is equipped with twenty toll line drops and jacks for use at night only, or when it is not desirable or profitable to have an operator on duty at the toll board. The key shelf equipment of this position is shown in the lower left corner of Fig. 104, marked "B" section. The key equipment consists of three toll to toll cords with wiring for two more, and seven toll to local cords with wiring for three more. This position is also equipped with an operator's set. The listening key and ringing key for the front cord is located in front and the ring back key, or ringing key for the rear cord, in the rear. The relays and resistance coils for the toll to local circuits are shown located at the right of Fig. 105.

The second position is equipped with twenty incoming trunks, two "busy back" and two "don't answer" jacks, an operator's set and five order wire keys. These trunk circuits are equipped with machine ringing keys which are so designed that when the

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ringing button is once depressed for calling a subscriber, it will remain depressed and keep ringing the subscriber intermittently until the receiver is removed from the switch-hook of the called station, when it will automatically restore and cut off the ringing current. This allows the operator to handle more calls than by the regular hand method of ringing.

The third position has an equipment which is a duplicate of the second position.

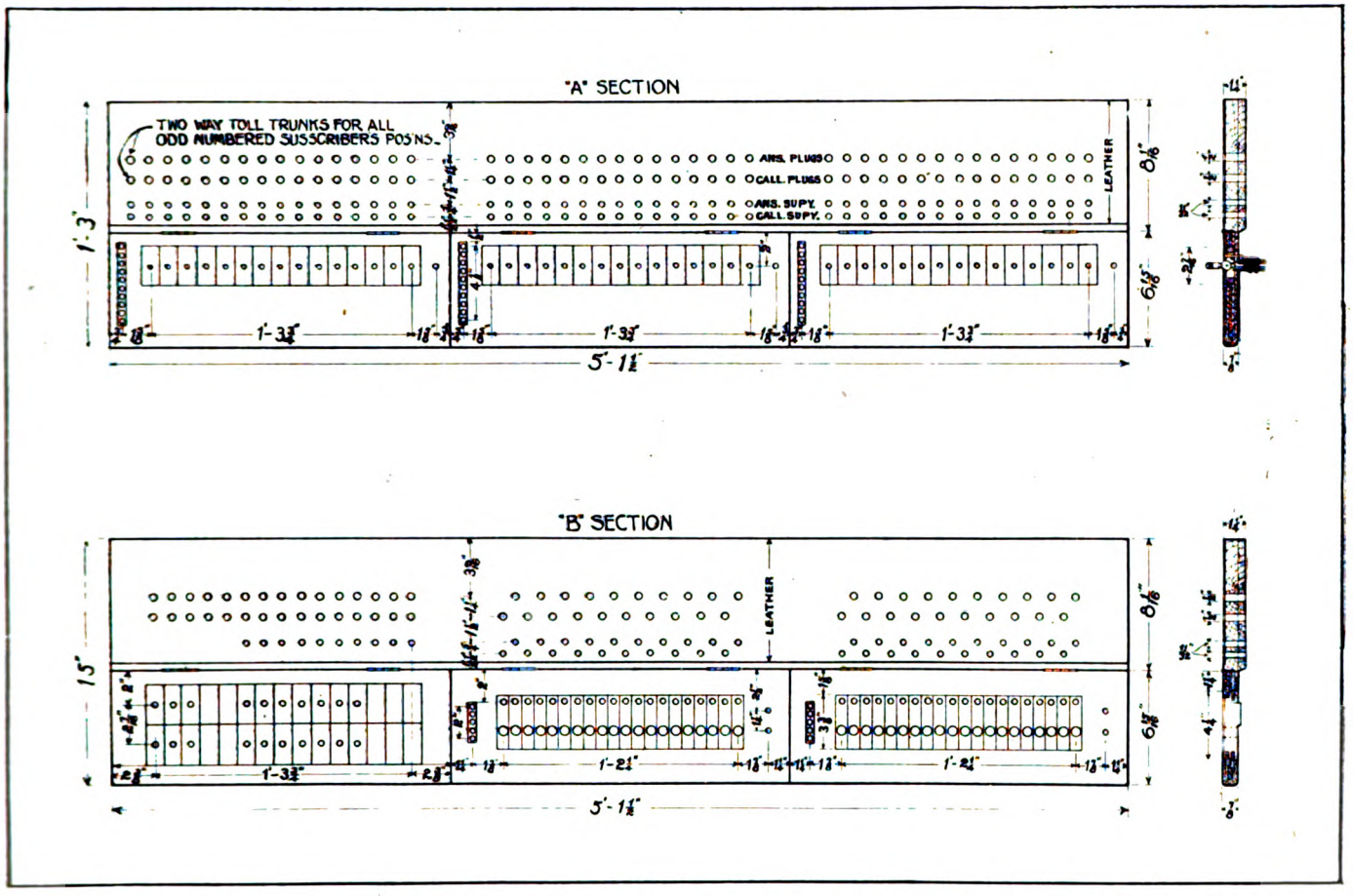

Fig. 104. Keyshelf equipment of the "Example exchange" common battery multiple switchboard.

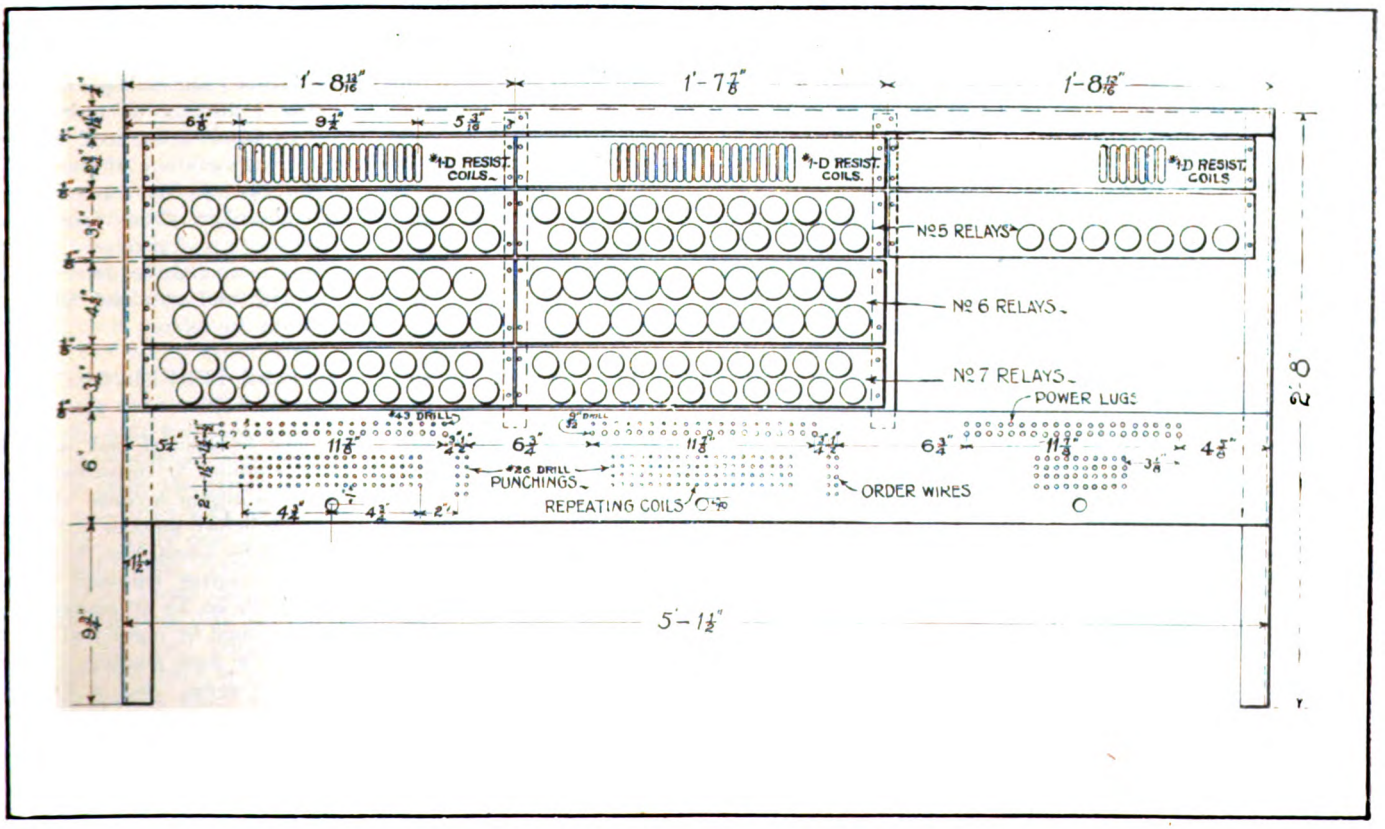

Fig. 105. Rear of first section; relay frame and connecting rack of the "Example exchange" switchboard.

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The arrangement of the key and plug shelf equipment for the two trunk positions is shown in the right and middle position of the "B" section in Fig. 104. The arrangement of the relays and resistance coils is shown in the middle and at the left of Fig. 105. It will be noticed that there are a good many punchings located on the connecting rack just below the relays. To these are soldered all wires within the section for the cord and operator's circuits which have to be run to other parts of the relay of calling cord No. 1, relay of answering cord No. 2, relay of calling cord No. 2, etc.

Each odd numbered subscriber's position is also equipped with a pair of two-way toll trunks, terminating in plugs at the local board, as shown in Fig. 104 and in jacks at the toll board.

Each section is equipped with 1,800 multiple jacks for subscriber's lines and 60 multiple jacks for outgoing trunk lines. Since the multiple jacks in one section are each wired to their

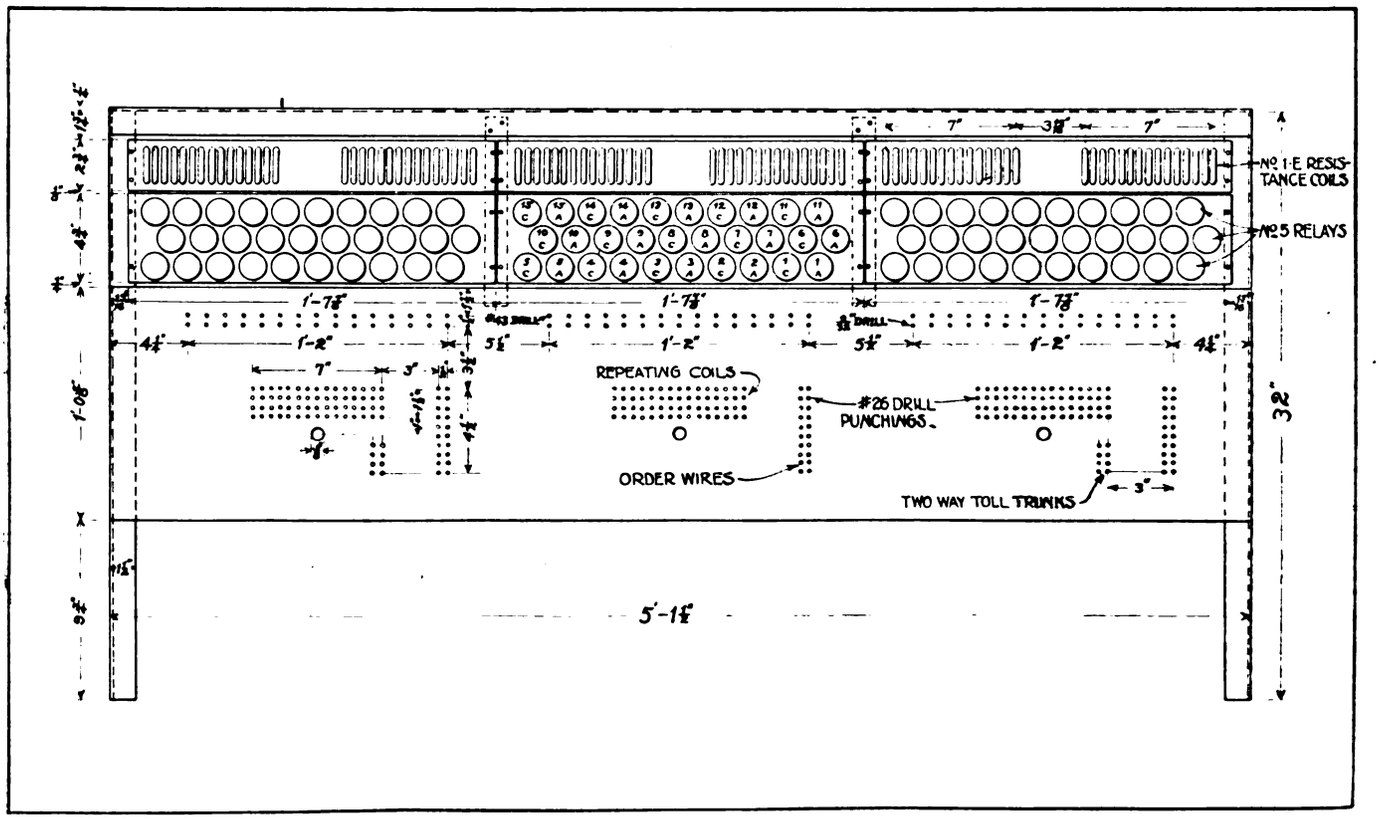

Fig 106. Rear of one subscriber's, or "A" section, "Example exchange" switchboard. Relay frame and connecting rack.

building after the sections are installed. This applies to all battery, repeating coil and order wire leads. These are arranged as indicated in a manner which makes all terminals of circuits extending beyond the switchboard sections readily accessible for the attachment of wires and their subsequent inspection when necessary for the clearing of trouble.

The fourth position is drilled and arranged for the same equipment as the second, but is left blank at present. A thin mahogany panel is provided to cover the key and plug shelf drilling.

Positions 5 to 22 inclusive are each equipped with 100 answering jacks and lamps, fifteen common battery cord circuits, an

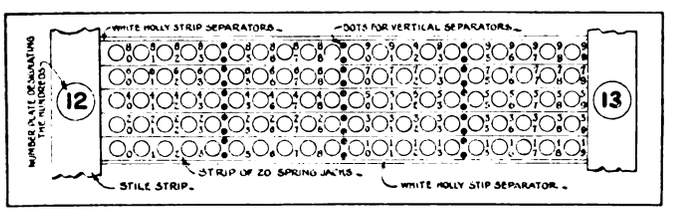

Fig. 107. Group of 100 multiple spring jacks, showing numbering.

operator's set and five order wire keys. The arrangement of the plugs, supervisory lamps and keys for these subscriber's positions is shown at the top of Fig. 104, "A" section, and the arrangement of the relays and resistance coils in Fig. 106. Fig. 106 also shows the arrangement of the wire connecting punchings of such cord and operator's circuits as extend to other parts of the building. The numbering of the supervisory relays 1A-1C, 2A-2C, etc., refers to the relay of answering cord No. 1, respective multiple jacks in other sections, each line reappearing once in every six panels, it will be observed that an operator at any one position will have to reach a distance of only two panels to the right or to the left (two panels being in front of each operator's position), in order to reach any one of the multiple jacks. This is why an operator can directly connect any calling subscriber to any called subscriber whose line may terminate in the multiple jacks of the same exchange.

The circuit to which these drawings refer and the description of same may be found in the April 11th and 25th and May 9, 1903 issues of THE AMERICAN TELEPHONE JOURNAL.

EFFECTIVE INJUNCTION MUST BE SERVED BEFORE ACT IS CONSUMMATED.

AN injunction, to be effective, must be granted and service obtained before the act to be enjoined is consummated. Many an injunction has failed to enjoin because of the swift work by the enjoined, so to speak, before process could be served, such as track laying by night. In St. Louis, Mo., recently one Dr. Mayfield wanted a telephone company enjoined from erecting a pole in front of his place. While he, his attorneys, the sheriff and a court clerk were rushing around by night trying to locate a judge the telephone workmen were busy digging a hole to plant the pole in. At this stage of the game, when it looked pretty certain the injunction would fail to arrive in time, the doctor's janitor was seized with an inspiration of genius. He trained the garden hose on the hole and the workmen and turned on the water. This damp substitute for an injunction was immediately effective, and it stopped further proceedings till the judge's temporary restraining writ had been duly served.

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A New Two-Party Selective System

By M. C. Wilson.

NO doubt a number of magneto exchanges have come to the alternative of using two party lines or making immediate extensions to their system in order to accommodate new business that may be offered them. Usually the equipment, particularly as regards lines and telephones, is incapable of being worked on any of the existing selective systems, as all of them

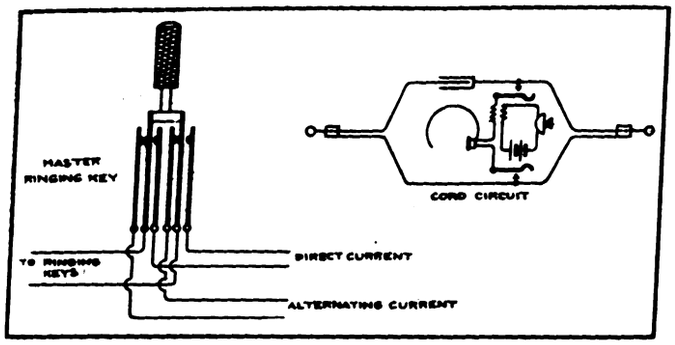

Fig. 1. Connections of condenser and ringing key in cord circuit.

that are practical require either metallic circuits, special telephones or both.

The Clay Center Telephone Company, of Clay Center, Kansas, is now successfully using a scheme by which two telephones are operated selectively on a common return system. The plan requires the two telephones to be connected in series, one an ordinary 80 ohm series instrument and the other a series instrument equipped with a direct current generator and a special bell. The bell is known as the Schwarze Universal Bell, and is intended to be rung by direct current, although alternating current will ring it unless hindered in some manner. The bells are wound to various resistances, 30 ohms. being the most common and most practical for lines up to about one-half mile in length. Over that length a higher winding up to 40 ohms is used. If the resistance of the winding is too high, the bell will be rung by the alternating current used to ring the polarized bell.

When operated in series with an ordinary 80 ohm bell, using current at about 65 volts, alternated moderately rapidly by a pole-changer, it will be found impossible to ring the direct current bell owing to the impedance of the ringers in series preventing a sufficient amount of current flowing to operate it. However, when a direct current of about the same voltage is applied to the line, the special bell will respond vigorously, while the ordinary polarized ringer will not be affected, except by, maybe, a single tap dependent upon the gong to which the tapper may be clinging.

The only additional central office apparatus necessary to operate the system on the ordinary magneto switchboard in a two-party selective key, wired as shown in the drawing, and a source of direct current, either battery or generator. It is not practicable to use the same battery as is used on the pole changer, as voltage will vary too widely if other operators are ringing.

There is no change necessary in order to use the standard cord circuit with the system but to avoid false signals from a ring-off a condenser may be inserted in the circuit as shown in the drawing. Only one is necessary, inserted in the line side, on a common return system.

The drawing shows the two bells as connected up in working order. No difference has been observed in placing either bell on the end of the line. During a conversation either party must talk through the other bell but that seldom causes any trouble. The longest line on which we have tried the scheme has a working resistance, including instruments of about 400 ohms, of which about 160 ohms is in the two telephones and heat coils, leaving about 240 ohms as the line resistance. This is much higher than the average. The bells can be rung on lines of any length, provided the voltage of the ringing current is high enough to give a current of from .18 to .22 ampere for the higher wound bells. From .3 to .4 ampere is required for the lower wound bells.

The most troublesome feature of the system is that line resistance is not always uniform within widely varying limits and ringing batteries are apt to vary in voltage. These two features must be carefully looked after when using the scheme or much trouble will be experienced with the special bell. It is likely, too, that the telephone will be used by a party who is most impatient at any real or fancied trouble; e. g., a new subscriber. Another feature that may, at times, cause some slight confusion is the fact that a ring-off from a third party may ring the polarized bell. This might be prevented, to a considerable extent, by inserting condensers in the cord circuits. Taking it all in all, it will be found to operate very well where it is necessary to install a two party system of some sort in order to handle some classes of business, or to tide over an emergency.

The system was originated, so far as is known, in the exchange at Clay Center, and is believed to be the only one of the kind in use at the present time. The exchange has some 600 subscribers connected to it and about 150 of them are on these special two party lines. The system will, no doubt, be of benefit to many exchanges that may be in need of something in the way of equipment for a small number of two party lines.

WHY INDEPENDENT COMPANIES CAME BACK.

SIX months ago three local Independent telephone companies in Montgomery County, Indiana, broke with the Home Telephone Company of Crawfordsville and entered into an exchange of service agreement with the Bell Telephone Company. During the past week the three companies returned to the Home Company and are glad of the privilege. They state that the service given them by the Bell Company was abominable and the business relations unsatisfactory and far from agreeable. "Never again will we flirt with the Bell Company," said the secretary of one of the three companies.

KINLOCH COMPANY REBUILDING ITS SYSTEM AT NORMAL, MO.

THE Kinloch Telephone Company is completely rebuilding its system at Normal. It has leased the second story of the First National Bank building into which it will move its exchange, which will be materially enlarged. A new switchboard with a capacity of 700 telephones has been ordered and is

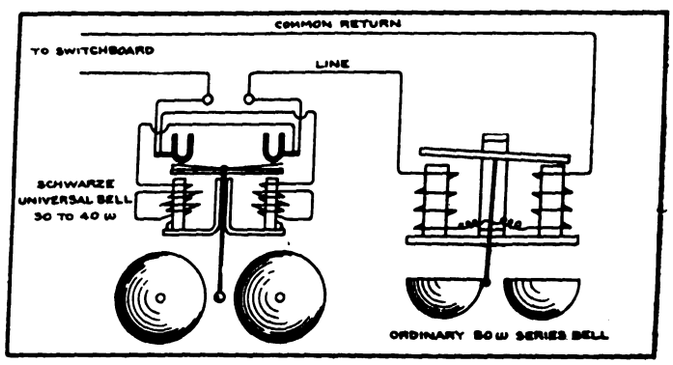

Fig. 2. Line connections for bells at subscribers' stations, on two party selective system.

expected to be installed in the new exchange early this month. This board will be of the central energy type.

The system will be similar to the one installed in Bloomington a few years ago. About 300 new poles are being erected to carry new aerial cable leads. A new 50 pair cable will connect the Normal and Bloomington exchanges to be used as trunk lines. This will double the present connections between the two offices and will greatly relieve the traffic. A large amount of underground cable will also be installed so as to remove the aerial lines as much as possible from the business and residence streets.

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THE EDITOR'S PAGE

THE ULTIMATE PROTECTION.

THERE are many things which indicate that telephone companies are in recent times devoting much more attention than formerly to the subject of protection from fires. Buildings which contain telephone equipment are being constructed in accordance with the high standards of the insurance companies. Wide and long continued experience has shown the nature of the accidents which expose exchanges to risks due to the passage of unexpectedly strong currents over various portions of the wire plant. Modern methods of line and switchboard construction take into consideration these dangers, and provide for the reduction of the possibility of their occurrence to a minimum. Protective devices are arranged for the shunting of strong currents accidentally communicated to the wires into paths which prevent their passage through the most delicate parts of the equipment, or those most vital to the operation of the exchange. Provisions are even made in many switchboards for the restriction of fires to the portion of the plant in which they originate, in order that flames may not spread widely before they can be checked.

Unfortunately there are many exchanges in operation to-day which were installed before all these protective plans were developed. The inconvenience and high cost of their execution have prevented their universal application to old equipments, and even where they have been introduced, imperfections in their application, or the omission of one or more of the known precautions have left open loopholes for the occurrence of disastrous fires. That such omissions do introduce a risk is shown by the frequently occurring instances of at least partial destruction of central office equipment.

A fire in a telephone exchange may in all probability be said to require more intelligent action on the part of the force employed in the building where it takes place than in most establishments where business of another nature is carried on. It is extremely likely to start in such a manner that it may readily be extinguished, and its cause removed by proper remedies quickly applied. The special nature of the usual causes and the special dangers outside of the fire itself to which the equipment is exposed are the conditions which call for unusually well considered action. The control of a fire due to a current of high voltage introduced from the outside plant is liable to subject an uninformed employee to personal danger. It is also important that the nature of the switchboard equipment prevents the use of water in all but the most urgent cases, and calls for the careful application of other means for the extinguishment of flames. If the appliances at hand are not used with coolness and skill there is a possibility of extending the damage far beyond the limits to which it might easily be restricted. The necessity for avoiding any interruption of the service is such that operators must remain at the switchboard, and continue to handle calls up to the point where they begin to be subjected to risk of injury.

These conditions are well known, and their imperative nature well understood by all persons experienced in the operation of exchanges. In spite of this fact, however, many reports of small fires convey details which indicate that the conditions have not been met in the proper manner by the larger number of those present at the time of the accident. There have been numerous cases of delay in calling the persons competent to handle the difficulty. Appliances for the extinguishing of fires have been absent from their proper places, or if at hand, and located where they should be, they have been in poor condition. Operators have yielded to a natural timidity, and unchecked by strong control, or previous thought on the proper course of action, have abandoned their work without proper cause, and hurried from the room in disorderly fashion, bringing upon themselves the danger which always accompanies a panic of even slight extent.

Such occurrences have led to the adoption in many exchanges of careful systems of inspection of apparatus, and instruction of the force as a whole in the proper course to pursue in a time of emergency. At such a time the advantages of a regular training are felt by all present. In a time of danger the person who can conceive an absolutely new thought, a plan of action which is the one correct course from the many which are open, and have it complete and ready for execution all on the spur of the moment, has indeed a wonderful mind. To the honor of our telephone men, and our telephone operators, there have been told stories of just such action, when individuals have been inspired to the performance of deeds most highly creditable. Nevertheless it will be easily conceded that in the final resort, when careful design and good workmanship have failed, the best safeguard is a force trained to consider the proper line of movement to produce a result with which the imagination is familiar. Each individual instead of yielding to blind impulse, or vainly groping for an idea, recalls vividly a familiar train of thought. Action, rapid and precise, follows, and the difficulty is speedily overcome.

CONSTRUCTIVE TRANSMISSION.

FROM the point of view of the theorist, the problem of the reproduction of speech by means of the building up of complex electrical waves from a number of simple waves presents many attractive features. Such a process would bear a close general analogy to the actual vocal process which results in the production of speech. All students of acoustics are familiar with the fact that the articulation of each of the different vowel sounds, a, e, i, etc., is dependent originally upon the production of a tone of characteristic pitch due to the vibration of the vocal chords. These chords, lying in the throat, form a diaphragm with a slit along its middle. The edges are thin, and are susceptible to mental control like any other muscles. They are made to vibrate at the same time that a current of air is forced between them, and the rate at which they vibrate causes the production of a sound of corresponding pitch in the same manner that the vibration of a reed in the pipe of a flute produces a sound with a pitch dependent upon the natural rate of vibration of the reed. The vibrations of this column of air in the human throat are reinforced by the resonance of the chamber formed in the cavity of the mouth, in the same way that the sound produced in an organ pipe is reinforced by the resonance of the column of air within the pipe. Numerous attempts to produce artificial speech by mechanical means on the basis of these principles have met with a considerable degree of success.

It is evident that if a similar process of building could be applied to electrical waves, a resultant varying wave could be formed which would correspond to the variations of the voice. By the use of properly tuned circuits the phenomenon of electrical resonance would be brought into play, and greatly increase the strength of the transmitted currents. In this event it is extremely likely that the limits of the distances over which transmission of speech would be possible might greatly exceed those which prevail under the present method of varying the resistance of a circuit.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

INJURY FROM FALL OF INSULATOR.

A pedestrian on the sidewalk was injured by an insulator falling on him The insulator fell because hit by a stone thrown by a small boy in an adjoining alley. The party injured now threatens suit, claiming that the insulator would not have fallen if it had been properly fastened. The insulator was not broken in any way when picked up, so must have been loose or it would not have given away. Shall we settle the case? A. R.

YOU would do well to settle the case. The insulator would not have fallen had it not been hit by the stone; neither would it have fallen had it been properly secured. While your company is not responsible for the act of the boy, it is responsible for the security of the fastening of the insulator. The plaintiff would have the right to attribute the injury to either the boy's act or the company's act, or both. A settlement, if it can be secured on favorable terms, is therefore advisable.

LAWFUL HOUSE MOVING AND BREAKING OF WIRES.

A contractor moving a house along the highway broke down one of our wires that happened to be in his way. While it was done accidentally I believe he should pay our damages. This is so especially because the charter of our company imposes a penalty on any one who breaks our wires. The house mover claims he ought not to pay because he had permission from the city council to move the house. Now the charter authorizes us to recover the penalty and damages for the injury sustained. Is there any reason why we cannot do so? C. E

IT has been held that such a provision in a company's charter as you mention does not apply to the case of a defendant, who, in lawfully moving a house along the highway, breaks down a wire which happens to be in the way. If the contractor was negligent he would be liable for damages in spite of the charter provision, but if such was the case, you could not recover the penalty. See Telegraph Company vs. Wilt, 10 Pa., Law J. 375, 8 Leg. Int. 238.

THE QUEEN CITY HOME TELEPHONE COMPANY HAS BEEN REORGANIZED.

THE Queen City Home Telephone Company, of Cincinnati, O., has been reorganized and incorporated under the laws of Ohio, by Harry B. Gales, of Indianapolis, George W. Beers, of Ft. Wayne, and other Indiana men. It will be remembered that the Supreme Court of Ohio recently declared the former organization of the company invalid, because the incorporation laws of Ohio had not been fully complied with. The reorganization is to overcome this and the company will make another effort to get a franchise in Cincinnati. The new council is said to be favorable to the franchise.

EXEMPTIONS FROM TAXES.

THE state of Minnesota instituted proceedings against the Northwestern Telephone Exchange Company to obtain judgment for taxes. The company interposed the defense that it was exempt from taxes under the provisions of Chapter 314, page 581, general laws of 1897; that the company had paid the gross earnings tax provided by that act and that the property in question was necessarily used in connection with the operation of its business and not taxable by the ordinary methods. The trial court filed against the company and in effect, that the property was not necessarily used in the conduct of the company's business and was therefore taxable. By the constitution of 1896 the legislature was authorized to impose upon telephone companies, and there is a gross earnings tax upon any or all property owned by them in lieu of their taxes. Pursuant to this authority the legislature enacted that all companies in the state should pay the sum of three per cent. of their gross earnings which should be in lieu of all other taxes and assessments of whatever kind or nature upon all property held, owned or used by them in or about the construction, repair or operation of their business. The supreme court sustained the rule of the trial court and affirmed a judgment for the state. The lot upon which the taxes in question were levied adjoined the lot on which the central telephone exchange building of the company stands and is used for the purpose of storing telephone poles, material and supplies used in its business. It did not appear from the evidence that the company had no other place for storing such material. State vs. N. W. Telephone Exchange Company, 104 N. W. 1086.

ALLEGED FRAUDULENT RIGHT OF WAY CONTRACTS.

AT Bowling Green, Ky., a bill of complaint was filed November 21, 1905, in the Chancery Court by H. C. Moore and E. C. Dennison against the Long Distance Telephone and Telegraph Company. Complainants in the bill state that agents of the company offered to furnish service in Davidson and Williamson counties at $1.00 per month on an Independent line; that the agents represented to them that all of the land owners south of them and between them and Franklin had granted them a right of way and that all the franchises that were desired had been granted by the city of Franklin; that relying on these statements the complainants signed a paper granting the company a right of way. The bill in substance alleges that a fraud was practised on them because of the representation made and asks that the instrument executed be declared null and void and be cancelled and that the company be enjoined from disposing of, or pledging as collateral, the right of way obtained from Moore and that they be enjoined from entering upon the property or using the same in any manner. A writ of injunction was ordered as prayed for in the bill.

NEGLIGENCE OF PEDESTRIAN STRUCK BY WIRE WHILE CROSSING STREET.

A PEDESTRIAN in Lewistown, Pa., while attempting to cross one of the streets at a point other than the regular crossing, was struck by the wires of an electric light company and sustained injuries from which he died. The wires were attached to an arc light which on the evening of the accident had been lowered for repairs. An employee of the company, after lowering the light, left it in charge of a boy while he went to secure a file. During his absence a horse pulling a sleigh dashed around a corner and struck the wires attached to the lamp which then struck the deceased. At the trial of the case the defense was that the pedestrian was himself negligent in leaving the sidewalk and crossing the street at a place other than the regular crossing. The Supreme Court of Pennsylvania held, however, that unless the danger of crossing the street was manifest it was not for the court to say that the act of the pedestrian was negligent. Judgment for the plaintiff was accordingly affirmed.

Miller v. Lewistown Electric Heat & Power Co., 62 Atlantic 32.

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IN THE OPERATING FIELD

TERMS OF MERGER OF INDIANA COMPANIES GIVEN OUT.

AT a recent meeting of the stockholders of the Home Telephone and Telegraph Company of Fort Wayne, it was determined that the purchase of the National Telephone Company, with its long distance telephone lines in Ohio, Indiana and Michigan, and its local exchanges in Sturgis, Kendallville, Auburn and New Haven, would be completed within the next sixty days. This was determined upon at a postponed meeting of stockholders of the Home Company, at which the tentative agreement submitted some time ago was ratified.

There were 4,430 of the 5,000 shares of Home stock represented at the meeting when favorable action was taken, and only the ratification by the National stockholders remains to complete the details for the merger. A meeting for this purpose will be called shortly. Payment of the purchase price will be made in preferred stock of the Home company, bearing 6 per cent. interest. It was also decided to create a new issue of bonds to take up outstanding securities, extending the time of the bonds from twelve years to thirty years. Holders of the present bonds will receive new bonds in exchange for their present holdings. The new bonds will bear a rate of interest identical with the old, but the securities will be of higher value because they insure a longer interest-bearing period, and for the reason that the security is increasing in value from year to year by reason of the expenditures for extensions and improvements. The new issue of bonds will be $250,000, and with the merging of the company extensive improvements are in contemplation. The movement is in the nature of a protective action, for the Independents, local and long distance, are in a very large measure dependent upon each other, and the new alliance will make a very strong combination.

The election of officers resulted as follows:

Directors—Charles S. Bash, John B. Reuss, William L. Moellering, M. B. Fisher, Isador Lehman, P. W. Smith, G. Max Hofmann, W. A. Bohn, George T. Fox. President, C. S. Bach; vice-president, J. B. Reuss; treasurer, Max B. Fisher; secretary and general manager, William L. Moellering; auditing committee, H. R. Freeman, H. H. Hartwig, G. H. Loesch.

A resolution was also adopted providing for the addition of five members to the board of directors.

MASSACHUSETTS LIKELY TO HAVE ANOTHER INDEPENDENT COMPANY.

AN order granting to the Home Automatic Telephone Company the right to own, operate and conduct a telephone business in Brockton, Mass., was recently presented to the aldermen and tabled. A conference will be held upon it within a few days.

Conditions imposed upon the company in the order include the following: The city shall have the right to place wires in one duct or conduit, providing the same are low tension such as are used for fire alarm or police signal service; the company shall indemnify the city for damages to person or property; the company shall begin none of its work until it has displayed and exhibited to the mayor that it is financially able to carry on the business it proposes to do and also shows a reliable list of subscribers; the company shall place a bond of $5,000 with the city as a guarantee of good faith; the company shall install a first-class system with modern equipment and cable construction; the company shall complete its preparatory work in two years and must have 300 or more subscribers at the end of that time; the company shall not charge in rates over $40 for an unlimited service telephone for business houses and not over $25 for unlimited service for residences; the company shall furnish to the city free of charge 15 telephones for city hall or other use within a mile of the telephone exchange, and shall install such others as the city may need at an established discount from the rate usually charged.

The order drawn, if passed, will give the company the right to construct conduits, erect poles and other equipment in the principal streets of the city.

INDEPENDENT COMPANY OF DULUTH ERECTS NEW BUILDING.

THE new central office building of the People's Telephone Company is nearing completion and it is expected that shortly after the beginning of this month the company's offices and exchange will be located in the new building. Since the work of building started two months ago a large force of men has been kept in constant employment.

It is the intention of the management to have the structure the most modern of its kind and absolutely fireproof. An up-to-date heating plant is being installed, and the installation of switchboard and terminal equipment is now under way. The offices will be located on the first floor and the basement will be used as a supply and machinery room. On completion of this work the company will be fully equipped to give its subscribers the best service obtainable.

MEETING OF WISCONSIN INDEPENDENT TELEPHONE MEN AT MILWAUKEE.

THE annual meeting of the Wisconsin Association of Independent Telephone Companies was held on December 21st. Among other subjects discussed were methods of meeting competition of the Bell company. As a number of the members of the Association were known to have executed contracts which made their companies sub-licensees of the Bell system, they were ejected from the association by vote of the other members.

It was stated at this meeting that the Bell company obtains its sublicensee agreements with smaller companies by threatening to establish rival exchanges and give free service to the public if an interchange of service is not conceded.

It was further stated that the law of the legislature placing cities of the state in sixteen classes and requiring a uniform rate in cities of the same class is being disregarded by the Wisconsin (Bell) Telephone Company on the ground that it is unconstitutional. Racine, Oshkosh and La Crosse are said to be in the same class, but the rates of the three are said to be $3 and $2 at La Crosse, $6 at Oshkosh, and nothing in some instances in Racine. Plans were discussed for obtaining a fund to be used in bringing suits against the Bell company under this law.

Richard Valentine, of Janesville, was re-elected president of the association; J. C. Kuoni, of Sauk City, was elected vice-president, and H. F. Goodrich, of La Crosse, was chosen to be secretary and treasurer, to take the place of H. C. Winter, of Madison, who has been in that position for several years.

The executive committee for the coming year is:

William Van Middlesworth, of Racine; Philip Sheridan, of Green Bay; J. C. Harper, of Madison; G. M. Hibescheid, of Arcadia; E. I. Bates, of Chippewa Falls; John M. Baer, of Appleton; W. I. Bell, of Deerfield, and J. C. Crowley, of Superior.

It was announced that thirty-nine new companies were formed in Wisconsin during the past year, with a capital of $415,000.

In addition to considering matters relating to the general movement the association adopted resolutions endorsing the present effort upon the part of Independent telephone interests to enter

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Milwaukee. The resolutions cited that the Independent telephone companies are established all over Wisconsin; that they are corporations that have come to stay, and that Milwaukee should admit the Independent telephone interests.

ANNUAL CONVENTION OF THE NEBRASKA INDEPENDENT TELEPHONE ASSOCIATION WILL SOON BE HELD.

THE annual convention of The Nebraska Independent Telephone Association will be held in Lincoln, Tuesday and Wednesday, January 23, 24, 1906, with headquarters at the Lindell Hotel. This meeting is called at the request of the executive committee, W. E. Bell, G. T. Everett, F. E. Ebersole, C. W. Nunemaker and T. H. Pollock. An effort will be made to adopt some plan to harmonize the Independent telephone interests of the state. There are a great many important matters to be discussed and decided upon at this meeting and everyone who is in any way interested in Independent telephone development in this state or in adjoining states, is requested to be present.

A good programme and entertainment have been provided and a record breaking attendance is expected.

PROGRAM ANNOUNCED FOR THE MEETING OF THE ELECTRICAL SALESMEN'S ASSOCIATION.

THE Electrical Salesmen's Association has given out the program for its first regular annual meeting, to be held at the Grand Pacific Hotel, Chicago, January 20, 1906. At 9:00 a. m. the meeting will be called to order by Vincent Gray, president of the association. Following this will come the reading of the minutes of the previous meeting, the secretary's report, and then the report of Electrical Engineers and some suggestions, with E. E. Rines as chairman. After this will come the discussion of new business.

The afternoon program is as follows: 1:30 p. m. Our Purpose, President Vincent Gray; 1:45 p. m., Illustrated Address, J. Robert Crouse; 2:15 p. m., Modern American Meter Practice, R C. Lamphier; 2:45 p. m., Five minutes' addresses by a few of the members present, on Salesmanship; 3:15 p. m., Selection of next meeting place; 3:30 p. m., Meeting open for general discussion; 6:00 p. m., Adjournment; 6:30 p. m., Dinner; 8:00 p. m., All members are requested to be at the Coliseum at eight o'clock, where the Ladies' Tea Room has been placed at their disposal. They will also not forget to bring the ladies. Any information respecting the objects and organization of the association will be cheerfully furnished by Geo. H. Erich, the secretary, Room 51, 58 Washington street, Chicago, Ill.

INDEPENDENT COMPANY BRINGS APPLICATION FOR RIGHT TO OPERATE IN NEW ORLEANS BEFORE COUNCIL.

AT a recent meeting of the City Council of New Orleans, La., there was introduced an ordinance granting to A. Von Hoffman and his associates the right to establish and maintain a telephone system in the city for a term of fifty years. It is provided that within two years the company shall have the system in operation and at least 5,000 subscribers shall be served in the time mentioned. It is stipulated also that the company shall provide a branch exchange at the City Hall for the use of various departments free of charge and telephones furnished to the police stations and other places controlled by the city shall not exceed the rate of $25 for each telephone. It is provided further, the city shall have the right to purchase the plant and all belongings of the telephone company at the expiration of fifty years. The city is protected by bond and deposits and obligations to restore streets and sidewalks. An underground system of wires is provided. The following rates are fixed for subscribers:

When 5,000 telephones shall be in operation the rental for full metallic long-distance telephones shall be as follows: Residence rates, 5 cents for each outgoing call under sixty calls per month. No charge for city messages above sixty calls per month.

Business Rates—For telephone for incoming service, per month, $1.25; outgoing city calls, up to fifty calls per month, 5 cents each; additional city calls up to 150 per month, 2 cents each; additional outgoing city calls above 150 calls per month, 1 cent each; at all stations and to nonsubscribers each call within the limits of the city shall be 5 cents each. The company reserves to itself the right to make contracts with subscribers at a flat rate basis if so desired by the subscribers. The company shall give to the city a bond for $25,000.

The ordinance was referred to the Streets and Landings Committee.

ACTIVE STEPS BEING TAKEN TO INCREASE THE A. I. E. E. BUILDING FUND.

THE General Electric Company in view of the great importance and utility of the United Engineering Building in New York as a home and centre for the engineering professions and arts, has made a contribution of $25,000 to the land and building fund of the American Institute of Electrical Engineers. President C. A. Coffin, who takes a warm personal interest in the matter, has also sent his own check for $5,000. The committee, which has already received gifts and pledges amounting to nearly $70,000, is greatly encouraged by this generous support of its work. The fund is now, with other new subscriptions, well over $100,000, and with renewed energy the committee has begun its canvass of the field with the object of securing the second necessary $100,000. About 600 members have already subscribed to the fund, and the committee expects to have no difficulty in at least doubling this number. It has just issued to the whole membership a handsome pamphlet, illustrating and describing the new building in course of erection in New York City, and detailing the steps that have been taken by the associated engineering bodies to give effect to Mr. Carnegie's original gift.

OBITUARY.

IT is with sorrow that we announce the recent death of Stephen E. Abbott. Mr. Abbott was born in Andover, Mass., in 1876. He graduated from Tufts College in 1900, and immediately entered the employ of the New England Telephone and Telegraph Company. Later he went to the Rocky Mountain Telephone Company, carrying on work in Utah and Idaho, and about a year ago he joined the installing staff of the Dean Electric Company. It was immediately after he had signed a report covering work on the exchange at Potsdam, N. Y., of which he had charge, that he was seized with a stroke of apoplexy, and died almost instantly.

He was a devoted son, loved and respected by his friends, and a hard and faithful worker. His untimely death will be learned with grief and regret by many telephone men who have known him, and it has removed from the industry a valuable man.

EXTENSIVE IMPROVEMENTS BEING MADE AT BELLEFONTAINE, OHIO.

PROGRESSIVE measures are being taken in the development of the United Telephone Company's system in Bellefontaine, Ohio. This company is experiencing a remarkable growth which has necessitated the addition of three new sections to its switchboard. Comparatively mild weather has enabled the construction of several new lines to progress very rapidly and there are being installed a large number of new instruments for parties who have been on the waiting list for some time.

The toll line service of the Bellefontaine exchange will be greatly augmented when several new lines now under construction are completed. One of these will connect Huntsville with Bellecenter and another will reach Janesville. The exchange at Lake View is to be moved to new and larger quarters and a number of new subscribers will be secured in this vicinity

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QUERIES

PHANTOM CIRCUIT.—(644.)

I have a toll line 54 miles in length. There are two different circuits on the same poles. One is a No. 12 iron wire circuit carrying 8 or 10 bridged stations. The other circuit is a No. 12 copper wire through circuit, with no stations on the line, which terminates at each end in a common battery exchange. I mention the iron wire circuit only to enable you to say whether it will be affected by the proposed arrangement of the copper circuit. Will you kindly let me know if I can arrange a circuit on the copper line, as shown in the attached diagram? If so, will it be a phantom or a simplex circuit? Will the coils be induction coils or repeating coils? C. F. L.

THE arrangement which you have submitted is called a "phantom" circuit and the coils at either end of the line are termed "repeating" coils. Your arrangement, Fig. 644*a*, a, will not be satisfactory because the phantom circuit employs an earth return and will therefore give no better service than an ordinary single-wire earth-return circuit. Grounded lines are al-

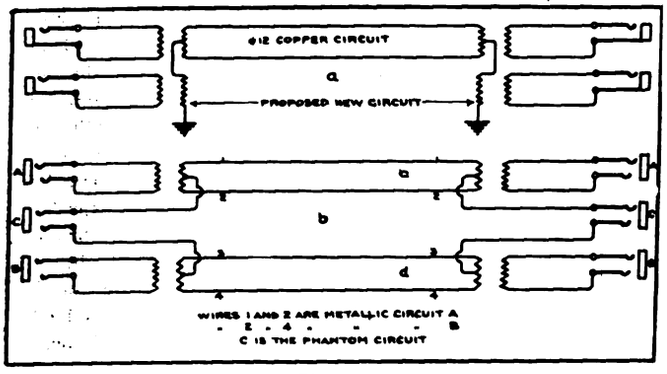

Fig. 644a.

most invariably noisy, because the inductive disturbances are greater than on metallic circuits and because grounded or earth-return circuits cannot be transposed.

You may also get considerable cross-talk between the phantom and the metallic iron circuit.

Figure 644*a*, b, shows the standard phantom arrangement, in which a metallic phantom is secured from two metallic circuits. The two component metallic circuits should be alike in all respects and should be on the same cross-arm and should also be adjacent to each other. Figure 644*b*, a, shows the relative pin positions which the two metallic circuits should occupy.

The circuits shown in Figure 644*a*, b, should be transposed; the metallic circuits should be transposed in the regular manner in which such circuits are usually transposed, by interchanging the

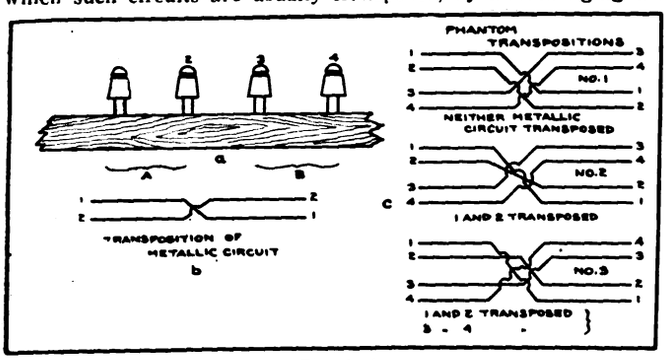

Fig. 644b.

two wires 1 and 2 or 3 and 4; then the two circuits A and B should be interchanged as a whole, wires 1 and 2 occupying the positions of 3 and 4 and vice versa. There is only one way of transposing two wires, but there are three ways of transposing four wires, and Figure 644*b* shows these different ways.

The component metallic circuits of a phantom may or may not be transposed at the phantom transposition, depending on which of the three methods in Figure 644*b* is employed. Only in No. 2,

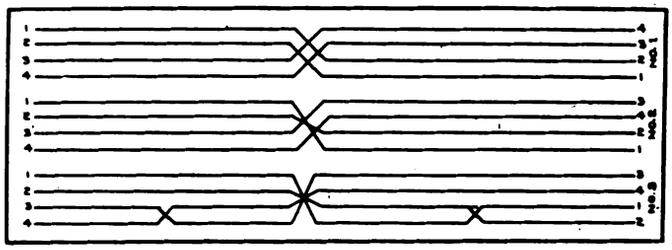

Fig. 644c.

Figure 644*b*, are the component circuits transposed. Figure 644*c* shows how the component circuits should be transposed to prevent cross-talk between them.

It is impossible to advise you how to transpose your phantoms without knowing how your metallic circuits are now transposed. You cannot obtain a satisfactory phantom by using both of your present metallic circuits because one is iron and the other copper. Intermediate telephones connected to either circuit will not interfere with the phantom if they are connected at points midway between the two nearest metallic and the two nearest phantom transpositions.

Phantom circuits are as efficient as the metallic circuits of which they are composed. They are subject to cross-talk and inductive disturbances just as metallic circuits are, and must be transposed to get rid of induction from lighting or power circuits carrying alternating currents.

The principles that apply in transposing metallic circuits also

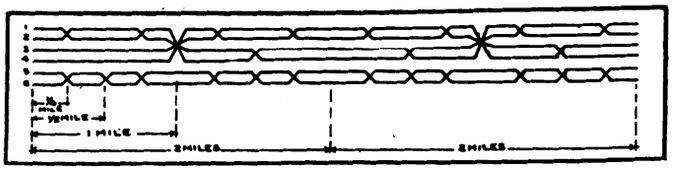

Fig. 644d.

apply in transposing phantom circuits, although the introduction of phantom transpositions may upset the previously existing relations between the metallic circuits, because the latter change their pin positions in a phantom transposition.

A grounded phantom circuit will be noisy and may cross-talk with the other circuits for the same reasons that obtain with an ordinary grounded line, which employs only one line wire and an earth return. Phantom circuits, to be satisfactory, must be transposed and balanced as carefully as a metallic circuit, having two line wires.

Should you string another copper metallic circuit, a good phantom can be obtained if the new wires are of the same size as those now existing. It will be sufficient to transpose the phantom every two miles, if there are only three circuits. Figure 644*d* shows a satisfactory method when there are three circuits; the method there given, is a two mile section or unit, of which sections there will be 27 in your 54 mile line. The intermediate telephones on your iron circuit should be connected as nearly as possible at the 2-mile points, or where two sections join. If a telephone should be connected midway in a section it will probably not introduce cross-talk of a serious amount, but an absolute balance in such a case could be obtained by shortening, for example, the 2-mile section, east, of the telephone station and lengthening the section west of the station.

Only one such grounded phantom circuit as you propose is possible on one pole line, because two such circuits will cross-talk so badly that only one circuit can be employed at one time.

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TELEPHONE PATENTS

MULTIPLEX TELEPHONY.

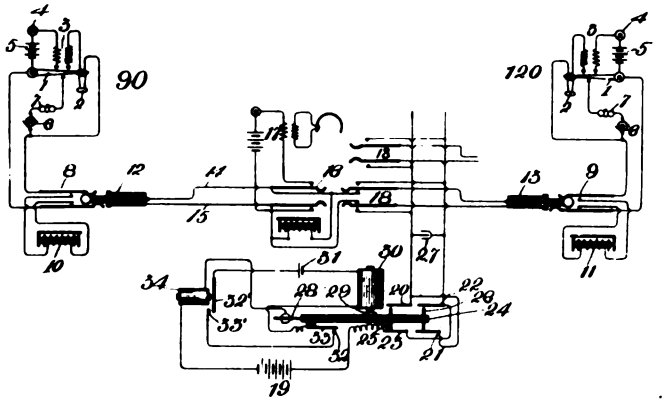
Albert Gould Davis, Washington, D. C., patents (No. 808,438, dated Dec. 26, 1905, filed April 22, 1897; serial No. 633,258) a system for multiplex telephony.

This invention discloses means for transmitting two or more messages over the same wire at the same time. As many generators of high frequency currents are bridged across the line wires as there are stations. The apparatus at each station is tuned to respond to only those currents which emanate from a similarly tuned generator. This is accomplished by means of condensers and inductance coils in series with the receivers and transmitters. The transmitters are made in the form of condensers, the compression of the plates, due to the air waves from the voice of the person talking, varying the capacity of the transmitter circuit. Thus if there are bridged across a line four distinct stations, *A*, *B*, *C*, *D*, four separate and distinct generators, A^1, B^1, C^1, D^1 would be necessary, each furnishing alternating currents of different frequencies, which should, however, be either above or below the audible limit, otherwise they would be heard in the receivers. If a line carrying four similarly tuned stations, A_1, B_1, C_1 D_1 is connected thereto, then station A will be able to talk to station A_1 without interfering with the other stations. The same hold goods for the other stations.

POLE CHANGER.

Harry O. Rugh, Chicago, Ill., patents (No. 807,870; dated Dec. 19, 1905; filed June 2, 1902; serial No. 109,841) and assigns by mesne assignments to Edward C. Hennis of Sandwich, Illinois, a pole changing device.

In this invention means are set forth for the design of a pole changer for ringing telephone bells. A pivoted armature 24 carries contact points 25 and 26 which are arranged to engage alternately with contacts 20, 22; 23, 21. An electromagnet 30 is provided to vibrate the armature and includes in circuit a battery 31, contacts 32^1, 33^1 of relay 34, and contact 33. The line wires to the ringing key terminate at diagonally opposite contact posts 20, 21; 22, 23, so that in one position of the armature



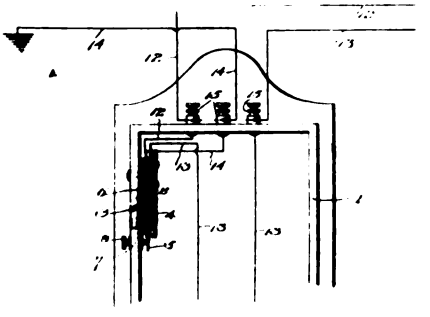
if the key 18 is operated the tip of the cord would connect with contact 25 and the ring with 26, and when the armature assumed the alternate position the connections between the tip and ring and the contacts 25, 26 would be reversed. Contacts 25, 26 constitute the terminals of the ringing battery circuit which is completed over the line and through the bells to be signalled. By tracing the circuit the path taken by the ringing current will be evident. The passage of ringing current to the line through the coils of magnet 34 causes it to attract its armature. The closing of contacts 32^1, 33^1 completes the circuit through local battery 31 and electromagnet 30. There results a movement of the arm 24 which is kept in vibration through the alternate opening and closing of the local battery circuit at contacts 32, 33. The purpose of introducing the electromagnet 34 into the circuit is to prevent the operation of the arm 24 at such times as the ringing key is not in use.

The condenser 27 is provided to smooth the alternations caused by the reversal of battery current.

SIGNAL SWITCH.

George H. Manners, Murray, Nebraska, patents (No. 807,626; dated Dec. 19, 1905; filed March 2, 1905, serial No. 248,140) a signal switch.

This invention relates to party line operation and provides



means whereby a subscriber can call either another party on the same line or the exchange at will. To accomplish this result three springs, 3, 5, 4, are mounted upon a plate 6, each spring being insulated from the other. A button 8 serves as the operating mechanism. Normally the contact springs 3 and 5 are in engagement and a complete metallic circuit is formed. Should it be required to use the ground as one side of the circuit, the button will cause the spring 5 to open its contact with 3 and close it with 4, which constitutes the ground terminal in circuit with post 15 and ground wire 14. A single claim is made in the patent, covering the arrangement and connection of contact springs in accordance with the above description.

TELEPHONY.

Albert G. Davis, Schenectady, N. Y., patents (No. 808,600, dated Dec. 26, 1905; original application filed April 22, 1897, divided and the application filed May 15, 1903; serial No. 157,246) a telephone system.

This is a subdivision of a patent filed April 22, 1897, and deals with the transmission of sound by means of suitable apparatus devised to increase or decrease the resonance of a tuned circuit.

The essential features of the patent are set forth in seven claims, two of which are given herewith:

Claim 1. The method of creating a telephonic current, which consists in impressing an alternating electromotive force on a circuit and varying the reactance of the circuit around a point near but not at the resonance-point in substantial accordance with the sound to be transmitted.

Claim 7. The method of multiplex telephony which consists in progressively varying the resonance of a plurality of branch circuits or local circuits, tuned to different frequencies, by the action of transmitters which furnish the inductance for said circuits, in accordance with the sound waves to be transmitted.

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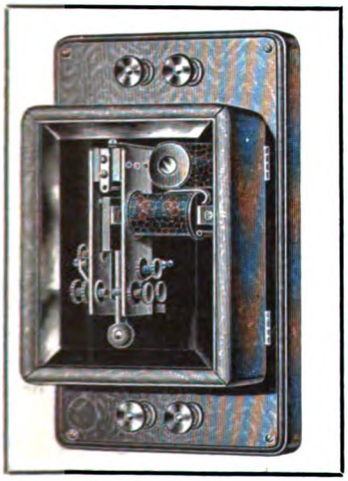

That the Sandwich Pole-Changer, "while its appearance in the cut is strikingly similar to the Illinois," it is a very different and much better instrument. The Sandwich Pole-Changer Company is not the successor of the Illinois Electric Specialty Company. They simply purchased the tangible property of the Illinois Company last June, who had been doing business at a loss for several years, and this is the reason why *their suit went by default.*

The Sandwich Pole-Changer was put on the market by E. C. Hennis, who employed the most careful and able Patent Attorneys to see to it that this instrument was absolutely non-infringing, and it infringes no patent, then or since issued on Pole-Changers.

The Sandwich Pole-Changer Company is strongly backed financially, and is placing these instruments on the market by the hundred each month, and will protect the interests of its customers and users, as well as its own, to the end.

The Sandwich Pole-Changer is an up-to-date instrument made by the best of mechanics, of first class material. Sent on thirty days' free trial, and is in the market to stay.

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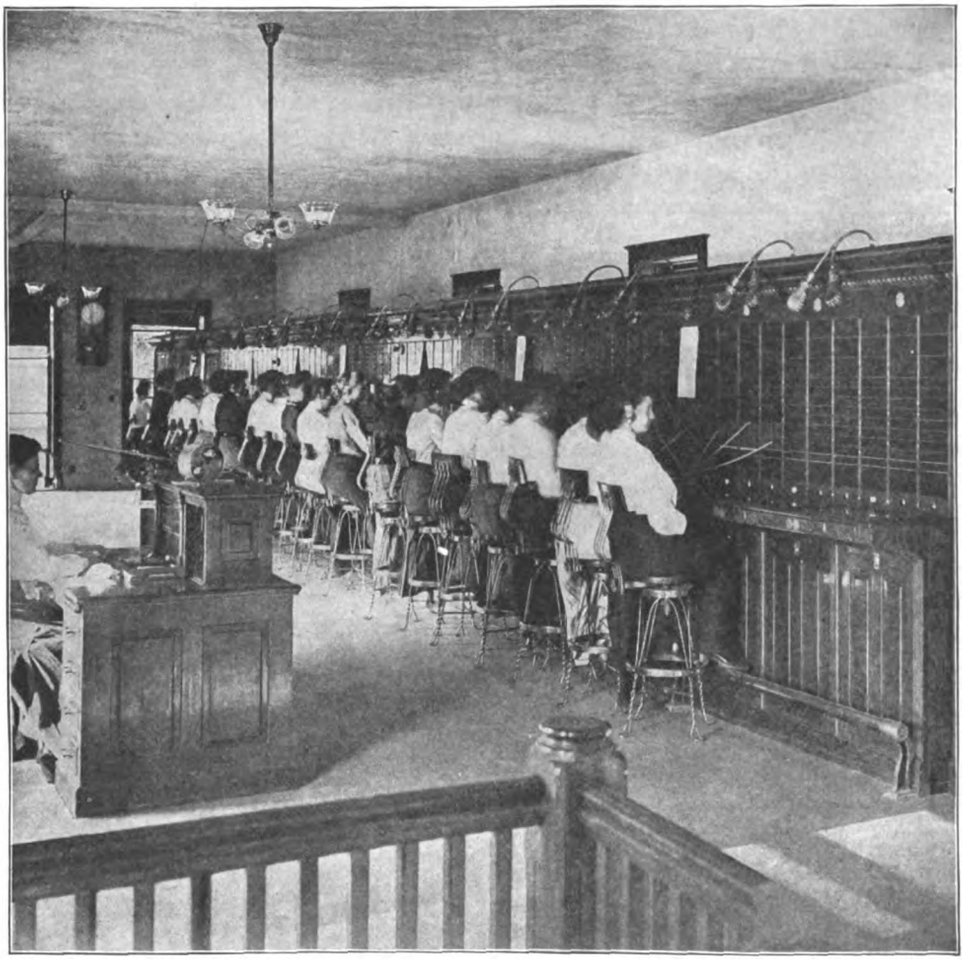
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

COMFORT IMPROVES EFFICIENCY.

MECHANICAL ingenuity has done much toward the improvement of telephone apparatus in general. It has simplified the work of the operator and has also been instrumental in adding to her comfort while at work. Such a simple device as an operator's chair would not appear to readily lend itself to improvement, yet a thorough examination of the old wooden type will show that it is not all it should be. It is cumbersome, difficult to keep clean, and much too heavy to be handled by the ordinary operator. These faults led to the design of a metal chair which is now rapidly superseding the wooden type. It is neat and durable, comparitively light in weight, and can be kept scrupulously clean with the minimum amount of attention. A chair having all these features is being placed on the market by the Electric Appliance Company, of Chicago. Amongst recent orders was one from the Interstate Telephone and Telegraph Company, for its Peoria exchange. A view of the operating room showing the chairs in use is given herewith. These chairs have adjustable spring backs, and adjustable seats, which can be readily raised and lowered. The edges of the seats are bound with metal. A special quality of steel wire is used for the framework, which, while reducing weight as much as possible, also offers the rigidity necessary for retaining its special shape. An oxidized finish gives these chairs a most attractive appearance and provides a surface which is not easily marred. Prices and full particulars respecting this article of exchange furniture can be obtained from the manufacturers upon request.



Metal Chairs Make Operators Comfortable and Increase Their Efficiency.

Especial attention is directed to the design of the chairs, which provides a form contributing greatly to the comfort of the operators. Comfort means freedom from fatigue, and an operator who does not get tired is bound to give good service.

THE BAIRD MANUFACTURING COMPANY is installing its secret service rural and party line system in many parts of the country and adding a large number of new exchanges to its list. Amongst the latest are Belle Plaine Telephone Company, Belle Plaine, Minn.; Henderson Telephone Company, Henderson, Minn., and Piper City Telephone Company, Piper City, Ill. It is very apparent that the Baird lock-out has come to stay. This will be good news to the many operating companies who are bothered continually with complaints of poor transmission caused by "listening in" on party lines, and particularly to those who are confronted daily by the difficulties resulting from rural line subscribers forgetting to hang up their receivers.

THE DEAN ELECTRIC COMPANY, of Elyria, Ohio, has received a contract from the Central Telephone Construction Company, of Wauseon, Ohio, for a complete common battery exchange equipment for Mobile, Ala. The switchboard is of five thousand lines ultimate capacity and is to have a present equipment of twenty-one hundred lines. This contract also includes the chief operator's, monitor's, and wire chief's desks and one thousand telephones. The new Dean 4-party harmonic selective ringing system is to be installed, individual indicating ringing keys being provided in each operator's position, also three sources of harmonic ringing current, two of which are the new Dean Harmonic Converter and the other a regular power ringing machine. In addition to this large item, the Louisville Home Telephone Company, of Louisville, Ky., has placed an order for two (2) complete common battery switchboard equipments, one for the Pewee Valley exchange and one for its Anchorage exchange. These switchboards are to be equipped with individual indicating ringing keys for Dean 4-party harmonic selective ringing, the source of ringing current being the new Dean Harmonic Converter. The Dean Company is to supply telephones for both of these new exchanges. The receipt of numerous large orders similar to these indicates that the company furnishes most satisfactory apparatus.

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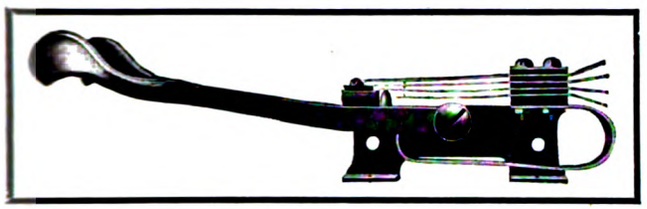
TROUBLE and HOOKS *Have always been inseparable*



No part of the telephone receives harder usage or more abuse. Long has it been known that SUMTER Hooks were "all right."

And now we offer a new one. Here are some of its features:

1st—Hook lever easily removable without removing escutcheon plate or changing adjustment of contact springs.

2nd—No circuit through hook lever, hook spring, or joint. Hook lever thoroughly insulated, no possibility of receiving a "shock."

3rd—Contact springs are long and flexible and are pointed with genuine platinum. They are held under tension and come to rest on a rubber block; when the receiver is removed from the hook, there is **no lost motion** to overcome.

4th—There is a rubbing contact between the different springs, and the contact points bite into each other.

5th—Every part is die made and interchangeable.

6th—The hook lever is a heavy brass **casting**, graceful in design.

7th—Like all good things this is well finished. **Every** part is heavily nickeled or oxidized, and is made the best we know how to make it, and—**WE KNOW HOW.**

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SERVICE IS THE ONLY TEST FOR DRY BATTERIES

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A test is inexpensive.

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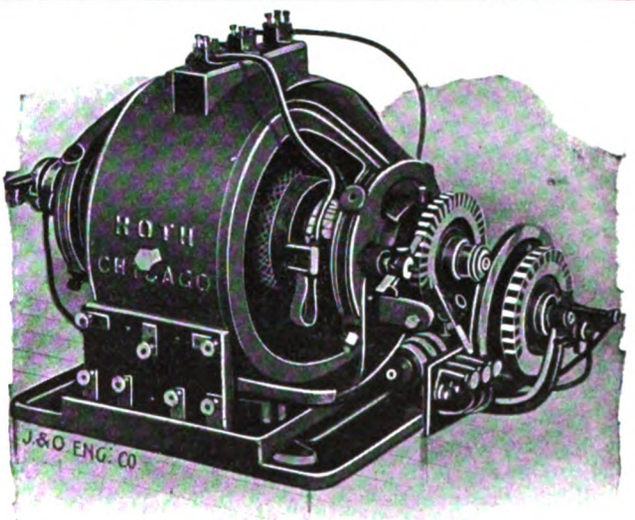

Dynamos and motors for telephone power plants are our specialty.

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There is no guesswork about their design and every piece of material used in their construction is the best than can be secured.

They are easily kept in adjustment and will stand more hard usage than any similar machine.

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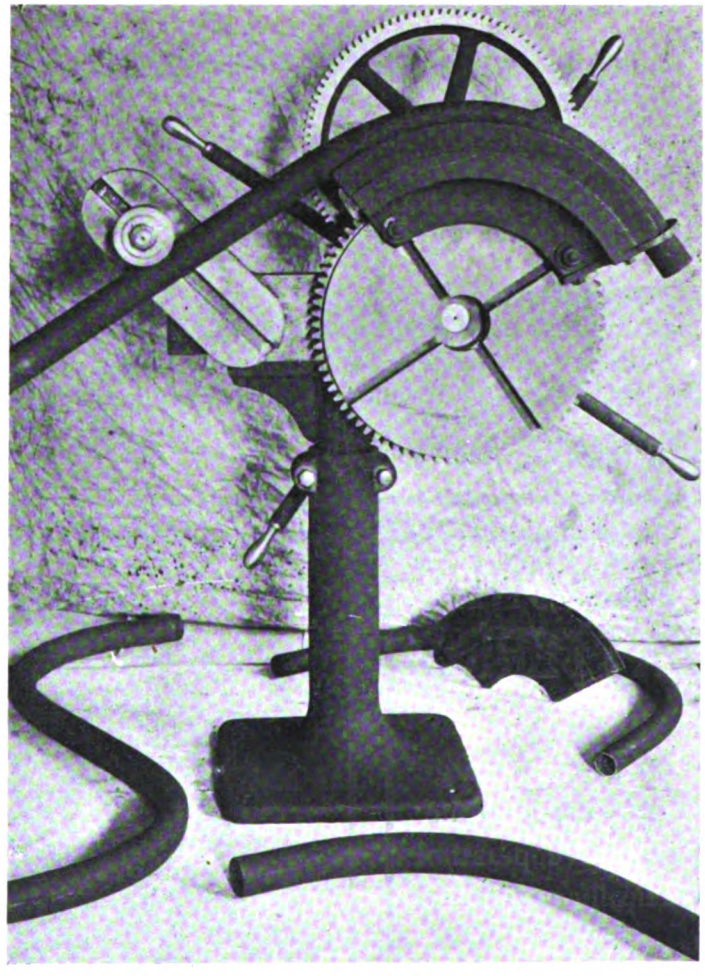
IN THE MANUFACTURING FIELD

A NOVEL PIPE BENDING MACHINE.

IN the regular course of his labors the telephone installer is called upon to accomplish certain work with which he is not familiar. Regulations of many modern buildings require that all wires shall be laid in conduit. This frequently necessitates the bending of conduit tubes to enable them to conform with a specified route which the wires must take. Pipe bending is a difficult operation and requires both skill and strength for its correct consummation. Realizing this, the firm of Pedrick & Smith, of Germantown, Pa., has recently brought out a pipe bending machine which greatly simplifies the work involved. This device is illustrated herewith.

The stand is telescopic and can be raised or lowered as desired. The portion carrying the mechanism can be revolved in any direction. A universal section or arm is provided so that if so desired, the bending device can be placed in a horizontal position.

The machine is operated by a hand wheel consisting of four handles which by means of compound gearing engages the face plate to which are attached the bending quadrants. The pipe is held in the quadrant at one end by a steel plate, while the resistance stud on the movable arm to the left engages the pipe at another point. Various curvatures are obtained by adjusting the position of the resistance stud in the "T" slot of the arm which has a swing of three-quarters of a circle.



Machine for Bending Conduit Pipe.

Quadrants are furnished for 1-inch pipe with a radius of 6 inches, for 1¼-inch pipe with a radius of 9 inches, for 1½-inch, with a radius of 12 inches, and for 2-inch pipe with a radius of 14 inches. While these four quadrants are furnished with the machine, it has been found that the smaller sizes of pipe can be very readily and satisfactorily bent with the larger size quadrants. In fact, workmen will not take the time to change the quadrants unless they desire a shorter radius than the larger quadrants will give them. The gearing is compound with a ratio of 25 to 1, thus giving the machine a powerful leverage. A boy can bend 2-inch pipe with little effort. With this type of bending machine, piping of steel, iron, brass, copper or other material can be bent cold up to and including 2 inches in diameter. It is also adaptable by means of special formers for bending light angles, flats or tee bars.

For companies which are called upon to use much conduit this machine will be found of great value, as it not only accomplishes the work in a very satisfactory manner, but is also a great deal quicker in operation than any other. Further particulars will be furnished by the manufacturers.

GEO. R. BLACKBURN, Cleveland, O., is mailing a descriptive folder and samples of the Blackburn ground clamp, and telephone companies having ground connections to make will be benefitted by requesting a sample. The superintendent of one of the largest telephone companies in the United States has written to MR. Blackburn: "We have made an extensive study of ground clamps, and wish to say that the sample you have submitted is superior to any other clamp."

THE AUTOMATIC ELECTRIC COMPANY, of Chicago, will show at the Electrical Trades Exposition its automatic telephone system such as has been adopted in Chicago and a large number of cities in the United States, in Canada and in Havana and Mariano, Cuba.

There will be on exhibition in the Automatic Electric Company's booth No. 20, Section C, a complete automatic telephone exchange of the 1,000 line type, with telephones connected. This automatic telephone system has been adopted in over seventy-five cities in the United States. The public exchanges range in size from 100 to 20,000 lines. There are a number of private exchanges ranging from 10 to 200 lines.

THE DE VEAU TELEPHONE MANUFACTURING COMPANY, of New York, will have an interesting exhibition at the Chicago Electrical Show, January 15 to 27. There will be shown a comprehensive line of instruments of the regular types manufactured by this company. These will include the well-known Automatic Switchless telephones, and a large number of different types of instruments for hotel and other intercommunicating systems, as well as instruments designed especially for marine service. The company will also exhibit switchboards of standard design for different classes of service.

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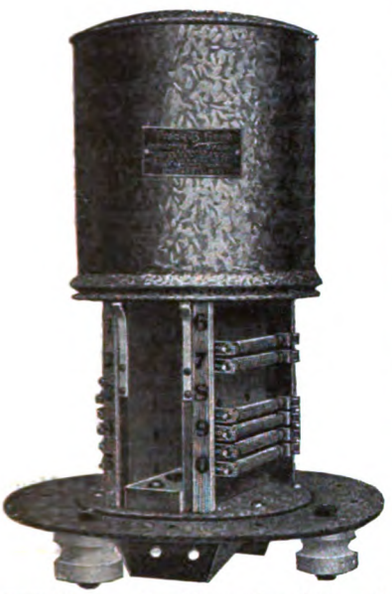
Two NEW Cook Terminals



TYPE T-6. Combines Terminal and Distributing Ring. Very Economical. For Multiple Tap Cable work.

TYPE T-4. New Terminal for Multiple Tap Cable Distribution.

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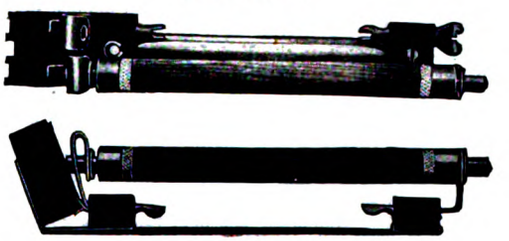
MULTIPLE TAP CABLE DISTRIBUTION

TOP VIEW.



SIDE VIEW.

Two Views of Individual Protector Mounts for use on Type T-4 and Type T-6, Cook Terminals.

ORDER ANY INITIAL CAPACITY and INCREASE IT AS DESIRED, by simply adding Protectors—one pair at a time.

Write for Terminal Catalogue describing these and all other Cook Terminals.

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FINANCIAL.

GAINESVILLE, FLA.—The East Florida Telephone Company has declared a fifth annual dividend of 2½ per cent.

ANGOLA, IND.—The Steuben County Telephone Company has increased its capital stock to $100,000.

ELYRIA, O.—The Elyria Southern Telephone and Toll Company has increased its capital stock from $40,000 to $75,000.

TOLEDO, O.—There was recently consummated a sale of $50,000 of Toledo Home Telephone bonds to a St. Louis syndicate. The price paid was 92¾ net.

SEATTLE, WASH.—The Independent Telephone Company has declared its first dividend of 5 per cent.

FRANCHISES.

HYMERA, IND.—The Hymera Telephone Company, whose franchise was repealed, has been granted a new franchise to construct and operate a telephone system in Hymera.

COVINGTON, KY.—A franchise has been granted to the Citizens' Telephone Company.

ANGELICA, N. Y.—The Inter-Ocean Telephone and Telegraph Company, of Buffalo, has been granted a franchise to build a toll and local telephone line in Angelica. The new line will connect with the long distance line at Friendship.

EAST GRAND FORKS, N. D.—The Tri-State Telephone Company, of Minneapolis, has applied for a franchise at East Grand Forks, and expects, also, to be granted one at Crookston.

NEW LEXINGTON, O.—A new telephone franchise has been granted to J. B. Rhodes, of Zanesville, and T. J. Smith, of New Lexington. A new company is to be organized, to be known as the New Lexington Telephone Company. It is the intention of the company to build an up-to-date plant throughout the city.

COLFAX, WASH—The Automatic Telephone Company, of Tacoma, is seeking a franchise in Colfax.

MILWAUKEE, WIS.—The amended franchise of the Registering Telephone Company, represented by Albert Hoffmann, has been introduced in the council and referred to the committee on judiciary.

BRANTFORD, ONT., CAN.—The Automatic Machine Telephone Company has been granted a twenty-one-year franchise in Brantford.

COMBINATIONS.

KINGMAN, IND.—The telephone plant at Ogden, Ill., has been acquired by Jas. A. Terrel, of Kingman, Ind.

MINEOLA, IA.—The Independent Telephone Company, of Council Bluffs, has acquired the telephone exchange at Mineola. C. F. Nipp, one of the former proprietors of the Mineola Exchange, will remain in charge as manager.

AUBURN, N. Y.—Connection was completed Tuesday by the Farm and Village Telephone Company with Auburn. This gives local subscribers direct communication with Rochester, Buffalo, Syracuse, Oswego and intervening points. The Farm and Village Telephone Company now contemplates extending its system to meet the lines of the Poplar Ridge and Union Springs systems.

CANTON, O.—Messrs. Hoskins and Washburn have acquired possession of the United Telephone and Switchboard Company. J. C. Hoskins is the new president and R. B. Washburn secretary and treasurer.

ELECTIONS.

PROPHETSTOWN, ILL.—M. P. Hill has been elected president of the Prophetstown Mutual Telephone Company.

FINCHFORD, IA.—The Finchford Mutual Telephone Company has elected the following officers: President, C. H. McBride; vice-president, John Silver; secretary, G. A. Evenson; treasurer, W. S. Beaty.

MIDDLEFORK, IND.—The Middlefork Telephone Company has elected the following officers: President, Eugene Floyd; secretary, E. M. Catron; treasurer,, W. D. Thomas; general manager, J. Catron.

PENN YAN, N. Y.—The Milo Telephone Company has elected the following officers: President, A. C. Townsend; vice-president, J. A. Stone; secretary, M. L. Spooner; treasurer, A. Longwell: manager, J. J. Gardner.

CINCINNATI, O.—The Queen City Home Telephone Company has elected the following officers: President, G. W. Beers; vice-president, C. B. Wing; secretary and treasurer, H. P. Gates.

NEW COMPANIES.

CORNERVILLE, ILL.—The Saline and Hamilton County Mutual Telephone Company, Cornerville, has been incorporated with a capital stock of $1,000. Incorporators: O. A. Tate, J. L. Harris and W. H. Johnson.

LAKEWOOD, ILL.—The Lakewood Telephone Company, Lakewood, has been incorporated with a capital stock of $2,500. Incorporators: Chas. H. Duckett, J. E. Bowman and E. A. Weakley.

MAURICE, IA.—The Sherman Telephone Company has been incorporated with a capital stock of $2,000. Its principal place of business will be Maurice. Incorporators: J. C. Emery, Geo. R. Moir, Arie Van Wyck, K. K. DeJong, Wm. Brink, Henry Siege and Joe Rexwinkel.

HAYS CITY, KAN.—The Hays City Telephone Company has been incorporated with a capital stock of $25,000.

MENLO, KAN.—The Menlo Telephone Company has been incorporated with a capital stock of $3,000.

PALCO, KAN.—The Palco Telephone Company has been incorporated with a capital stock of $8,000.

PERU, KAN.—The Penmar Telephone Company has been incorporated with a capital stock of $5,000.

MANKATO, MINN.—The East Medo Telephone Company has been organized, and will make connections with the Mankato Citizens' Telephone Company.

KIRKSVILLE, MO.—A new Independent Telephone Company has been formed at Kirksville, and will install an exchange there.

HANNIBAL, N. Y.—The Hannibal & Martville Telephone Company has been incorporated with a capital stock of $1,000. The directors are: John F. Flint, Julius P. Rhodes, George Van Noate, George Crofoot, Maurice Palmer and James E. Gillis, of Hannibal, and Bert Howland, of Martville.

SCHENEVUS, N. Y.—The Davis and Rose Telephone Companies have consolidated, and in the future will be operated under one management. The new company has not yet been named. It is capitalized at $30,000. Under the new management the Worcester exchange will be built over and rural lines run to Decatur, South Valley, East Worcester and other points. An exchange is being installed at Pleasant Brook, and the line from Schenevus to Westville has been completed.

CARTHAGE, N. C.—The Carthage Telephone Company has been chartered with a capital of $5,000 by W. C. Petty and associates.

ROSEBORO, N. C.—The Roseboro and Fayetteville Telephone Company has been chartered to operate lines between these two towns, and in other sections, with $10,000 capital. A. M. Brittain is among the stockholders.

RUSSELL, N. D.—The Russell Telephone Company has been incorporated by G. F. McKnight and others with a capital of $5,000. A local exchange will be installed.

CALDWELL, O.—The Citizens' Telephone Company has been organized with a capital of $30,000. The directors are: M. W. Kuntz, L. R. Wheeler, Edward R. Spannagel, H. R. McClintock, J. A. Lemmox and J. H. Sparling. Options have been secured on the property of the Farmers' Exchange Telephone Company and the Summerfield Telephone Company.

SOUTH POINT, O.—The South Point Telephone Company, South Point, has been incorporated with a capital stock of $1,800. Incorporators: T. Ferguson, C. H. Brubaker, R. E. Kouns, John A. Ankrim, C. W. Ankrim.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies, and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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CHICAGO, ILL.

Wholesalers of Michigan White Cedar **POLES** *of* QUALITY

Five Yards *Prompt Shipments*

PITTSBURG & LAKE SUPERIOR IRON CO.,
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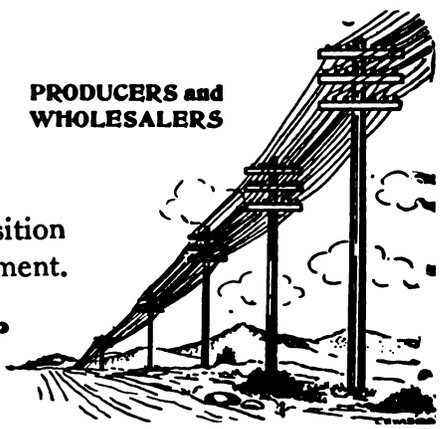

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

"From the Stump to the Line."

For a well built and well appearing line the poles should be cedar and

As Straight as an Arrow

They cost no more if bought from us and have the additional qualities of being sound throughout, well seasoned and strong.

Our stock embraces all sizes and we can ship immediately at

Prices That Are Right

SAND POINT CEDAR CO.
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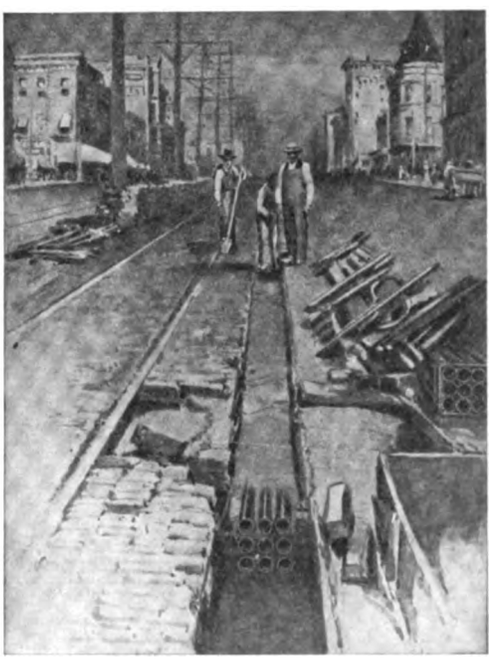
BITUMINIZED FIBRE CONDUIT
For Underground Construction



The American Conduit Company has a corps of experts in underground construction and is prepared to furnish supervision of work if desired. We would prefer to co-operate with contractors in underground construction, but if desired will submit estimates and bids and take contracts for completed underground systems in any part of the United States or Canada.

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Other Offices, 170 Broadway, New York 336 Macy Street, Los Angeles

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THE WEEK'S MESSAGES

TOLEDO, O.—The Western Ohio Telephone & Telegraph Company, Toledo, O., has been incorporated with a capital stock of $100,000. Incorporators: John Neilink, A. C. Stevenson, F. E. Paler, J. F. Davis, J. Lindall.

DUTTON, OKLA.—The Dutton Telephone Company has been incorporated with a capital stock of $5,000. Incorporators: Edgar Diehl, C. C. Fishes, Oliver F. Pruitt and O. L. Frain, of Dutton, and E. G. Cornett, of Verden.

MONTOUR FALLS, N. Y.—Frank Johnson and George F. Barton are interested in the formation of an Independent Telephone Company at Montour Falls, to be known as the Montour Telephone and Telegraph Company.

RINGWOOD, OKLA.—The Glenwood Rural Telephone Company, of Ringwood, has been incorporated with a capital stock of $400.00. The incorporators are: E. Frasier, L. A. Jonson and G. H. McDearmott.

BOYERSTOWN, PA.—The Mountain Telephone Company, to operate in southern Berks County, has been organized by local farmers and merchants. Work on constructing the lines will be begun at once.

BEAUFORT, S. C.—The People's Telephone and Telegraph Company, of Beaufort, has been incorporated with a capital stock of $15,000. The incorporators are R. E. Long, George Holmes and F. W. Scheper.

MILLER, S. D.—The Hand Telephone Company, of Miller, has been incorporated with a capital stock of $10,000, with the privilege of increasing it to $20,000. The incorporators are E. R. Waite, W. J. Holbaum and G. D. Richardson.

SIOUX FALLS, S. D.—The Sioux Falls Rock Telephone Company has been incorporated with a capital stock of $5,000. Incorporators: Joseph D. Hofer, Anna Hofer, A. A. Wipf and John Wipf.

MOUNTAIN CITY, TENN.—The Mountain City Telephone Company, Mountain City, Tenn., has been incorporated with a capital stock of $5,000. Incorporators: J. W. Tipton, R. E. Donnelly, J. M. Lacy, L. F. Miller and J. L. Curtis.

PERSONAL.

L. D. BRENNER has been appointed manager of the Central New York Telephone Company's exchange at Rome, N. Y.

H. K. COLE, of the Kentucky and Indiana Telephone and Telegraph Co., of Owensboro, Ky., is now a member of the Kentucky legislature.

JAMES P. HOWATT has been appointed manager of the exchange at St. Cloud, Minn., by the Northwestern Telephone Company.

J. J. MALONEY, formerly manager of the Northwestern Telephone Company's exchange at St. Cloud, Minn., will take charge of the exchange at Albert Lea.

R. S. MITTEN, who has been general sales manager for the Eureka Electric Company of Genoa, Illinois, for the past three years, has severed his connections with that company and has taken a position with the Electric Appliance Company of Chicago to assist Mr. S. A. Dinsmore, manager of the telephone department. He will have charge of the correspondence of the departmnt.

O. MORSEMAN, the well-known sales representative of the Kellogg Switchboard and Supply Company, is being congratulated upon his skill with the rifle. On a recent outing he demonstrated his ability to always bring back the goods by getting three deer with only the same number of shots.

H. H. NICHOLSON will be promoted to division superintendent of the division which includes the districts of Cooperstown, Watertown and Utica, by the Central New York Telephone Company. He will have his headquarters in Utica.

E. S. VINES has been appointed special agent for the division of the Central New York Telephone Company, which has its headquarters at Utica.

H. A. WADE has been appointed manager of the Peekskill exchange of the State Line Exchange Telephone Company.

MISCELLANEOUS.

HICKMAN, NEB.—The Hickman Telephone Company has recently completed its system. The company starts with over 100 subscribers, and will connect with systems at Lincoln and other neighboring towns.

TOLEDO, O.—The Toledo Home Telephone Company has secured the contract for installing a private telephone system in the thirty-seven school buildings of the city, the company agreeing to install the system for $1,000 a year, the company also to furnish the operator, and the exchange to be located for the present in the Home building. The board of education has looked with much favor on the proposition for some time, in that school business will be facilitated to a very great extent, and much of the dismissing of pupils from school to deliver messages to the office of the board will not be necessary when the exchange is once installed.

CAVE CITY, TENN.—During a recent fire at Cave City, the Telephone Exchange owned by George T. Tucker was damaged to the extent of $2,500.

PULASKI, TENN.—Having withdrawn its application for a franchise in the town of Pulaski, it is now announced that the Long Distance Telephone Company will buy property on East Hill, outside the corporate limits, and establish an exchange there.

New Construction in the Field

DECATUR, ALA.—The Morgan County Telephone Company is building long distance lines to Mobile, Nashville and Memphis.

MERIDIAN, IDAHO.—The Independent Telephone Company has extended its Meridian line to Kuna.

CHRISMAN, ILL.—The Wabash Valley Telephone Company is overhauling its system.

MARSHALL, ILL.—Extensive repairs on the local telephone system are being made by the Kinloch Telephone Company.

STREATOR, ILL.—The Streator Telephone Company expects to make improvements in its system.

BADGER, IA.—The Badger Telephone Company is to build a number of farmers' lines.

FLORA, IND.—The Flora Telephone Company is to install a new switchboard.

MALVERN, IA.—The Mills County Telephone Company has under consideration a great number of improvements in its system.

TABOR, IA.—The Tabor Telephone Company is building a line from Silver City to Mineola.

PARIS, ME.—The Woodstock and Paris Telephone Company is to extend its lines to South Paris to connect with the Citizens' Independent Telephone Company of Paris.

CHESTER, MASS.—A. L. Lewis and others, of Chester and Blandford, are to build a telephone line from Chester to North Blandford.

ALBERT LEA, MINN.—The Tri-State Telephone and Telegraph Company, of Minneapolis, is to install an exchange at Albert Lea.

KANSAS CITY, MO.—The Kansas City Home Telephone Company is to install another branch exchange.

SAUK CENTER, MINN.—The Northeastern Telephone Company is building out from Belgrade on the Soo line, and expects to extend its line to Sauk Center, using jointly the poles of the Pleasant Valley Company a portion of the way.

MACON, MO.—The Macon Telephone Company is to overhaul its entire system and bring its construction up to a high standard.

ASHEVILLE, N. C.—The Asheville Telephone Company is to construct an underground system.

ARCADIA, O.—The Arcadia Mutual Telephone Company is to build a toll line from Arcadia to Van Buren.

COLUMBIANA, O.—The Columbiana County Telephone Company is extending its lines to take in Ross Meadows, Cannons Mills and vicinity.

CANONSBURG, PA.—The Farmers' Mutual Telephone Company is considering the advisability of extending its lines into Amwell township, taking in Lone Pine, the township seat, and other points in that section.

MARKLESBURG, PA.—The Woodcock Valley Telephone Company, which has just completed a new line from Marklesburg to Entriken and Newburg, expects to extend its lines to other points.

SPRINGTOWN, PA.—The Franklin Telephone Company is installing many new telephones.

WEST ALEXANDER, PA.—The National Telephone Company is making extensions to its system. It will connect with the Claysville Telephone Company, which is installing a complete telephone system in West Alexander. The Claysville Company will also have a farmers' system in the near future.

SCOTLAND, S. D.—The Scotland Telephone Company is building a rural line.

MONTREAL, QUEBEC, CAN.—The Grand Trunk Pacific Railway Telegraph Company is seeking incorporation with powers to build telephone lines in addition to telegraphs. W. H. Bigger, Montreal, solicitor.

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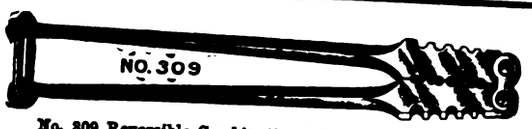

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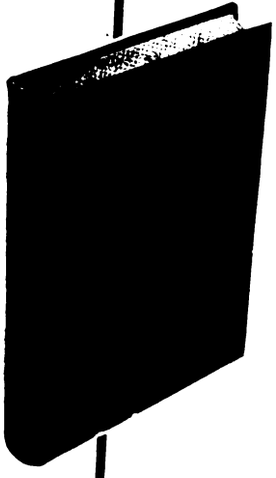

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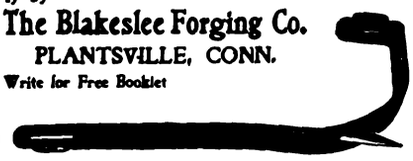

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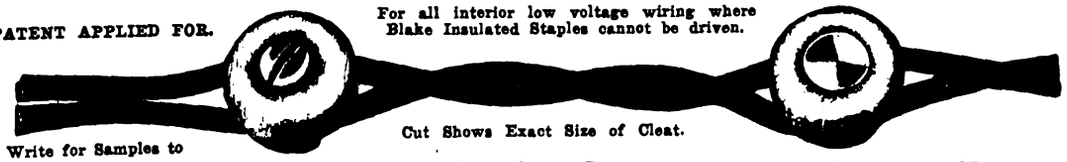

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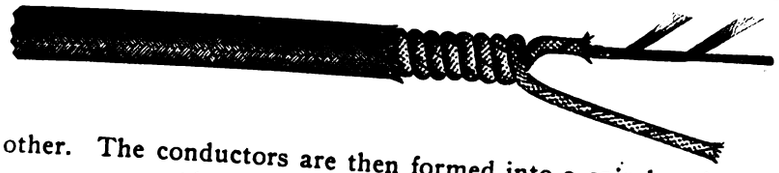
THE CORD THAT LASTS.



This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

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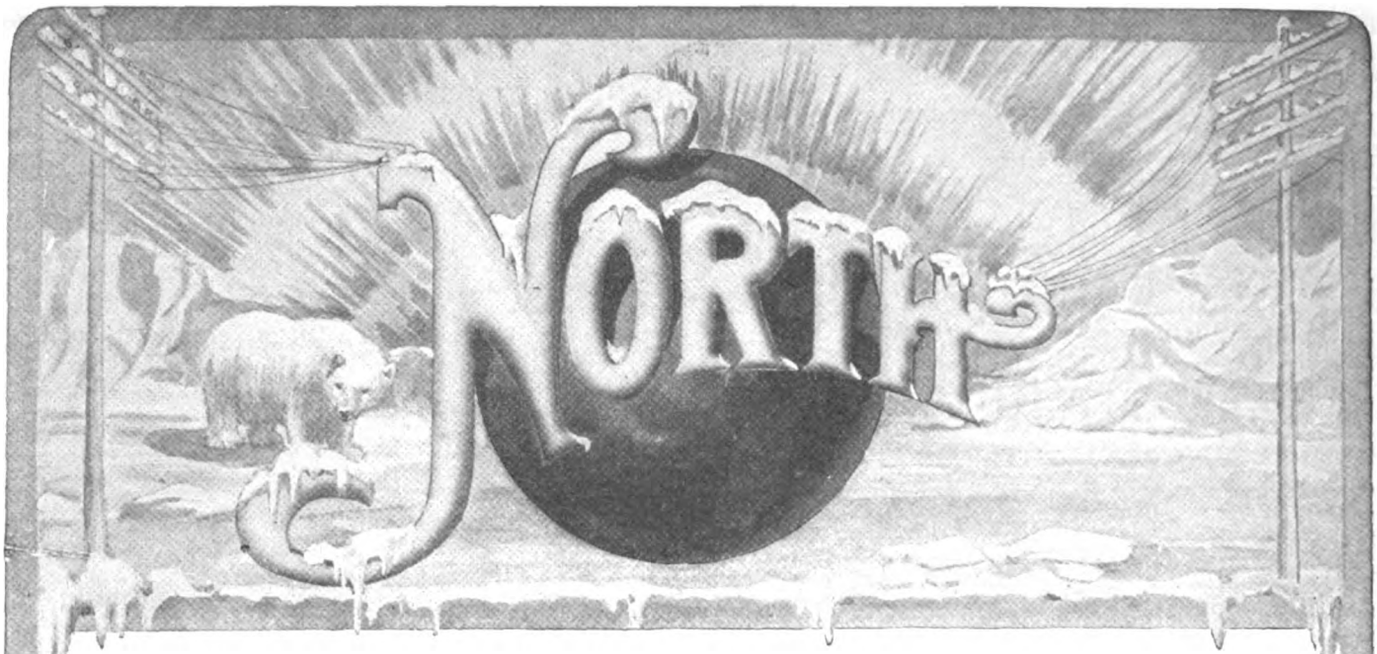

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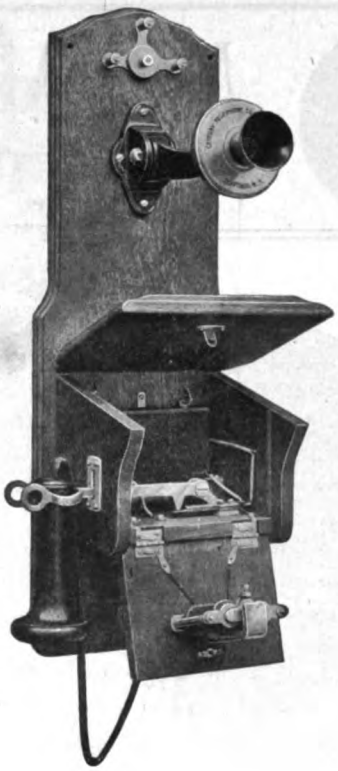

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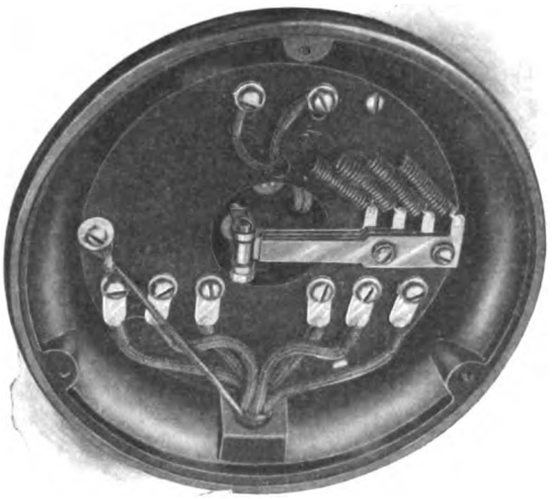

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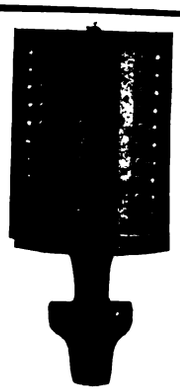

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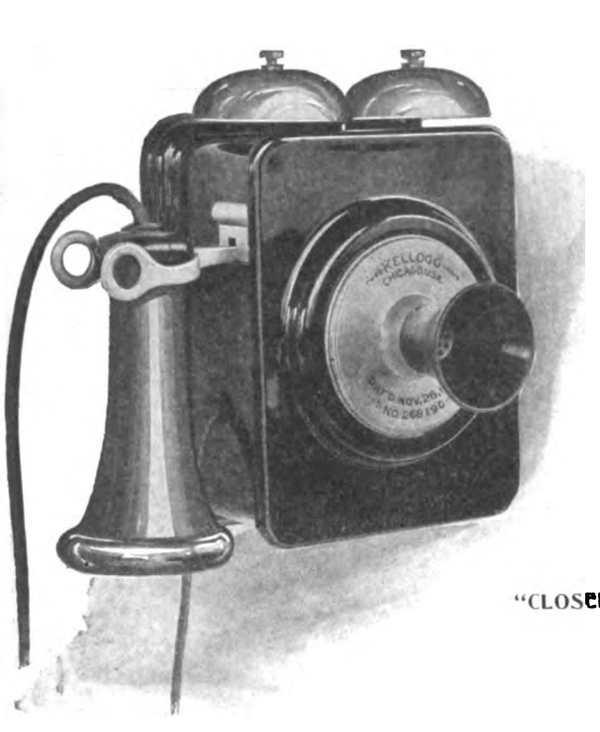

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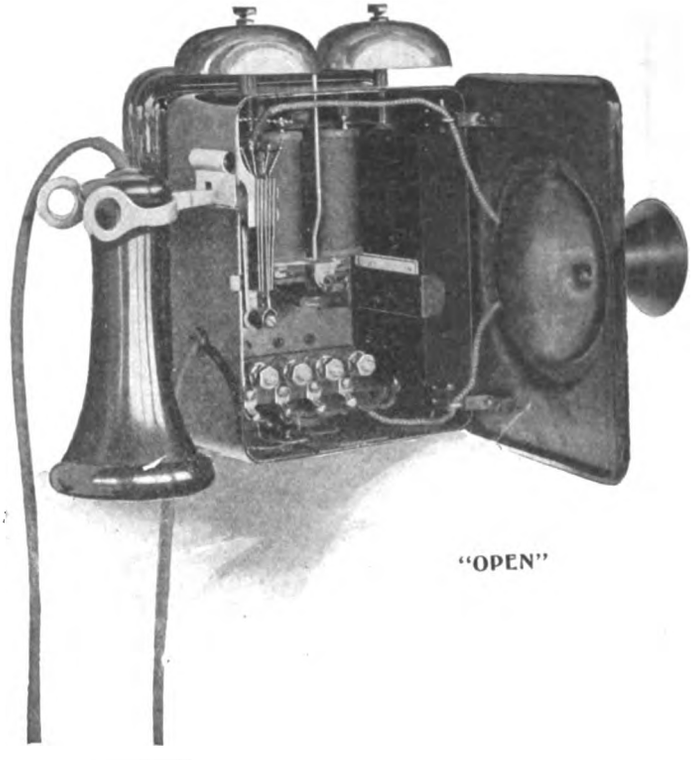

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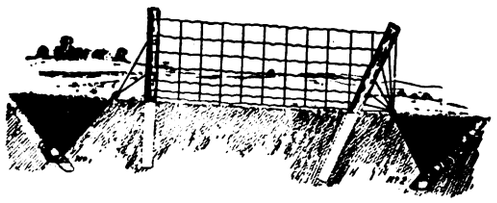

"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

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Are You Satisfied

with the manner in which your telephone system is operating?

Do your subscribers become displeased and out of patience with your line and the management of it because of the "listening in" of others?

Must their messages be delayed because of the carelessness of others in leaving their receivers off the hook "cutting out" the rest of the line?

Now Mr. Manager-of-the-telephone-company it's clearly up to you to eliminate these faults and (incidentally) improve the efficiency of your line 100 per cent. by installing condensers of approved design and recognized merit.

Such condensers are the product of our factory and are called

ANDRAE CONDENSERS

They are well known for their effectiveness and durability, but if you are in any way undecided as to their value we will equip an entire line on trial and pay return charges if unsatisfactory.

We manufacture three distinct telephone condensers and consider them the best.

They are the "Standard," Type XX, which is made to withstand 300 volts, alternating current, indefinitely and comes in various capacities from 1-4 M.F. to 3 M.F.

The "Special" No. 225, actual size 2 11-16 x 1 1-2 inches, terminals included, is easily installed in any bridging magneto box and recommended for use on 'phones already in operation.

Telephone Condenser No. 186 is our new form of condenser fitted in a handsome, quarter-sawed oak case. Easy to install because of its simple, compact form.

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We manufacture telephones and telephone accessories. None better.
WRITE FOR CATALOG NO. 11, which tells all about our products.

JULIUS ANDRAE & SONS COMPANY

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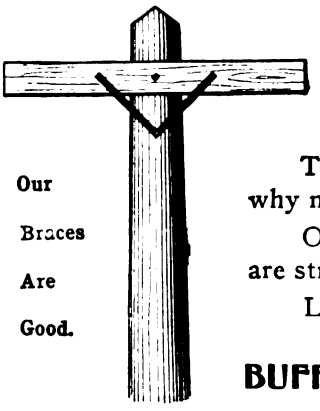
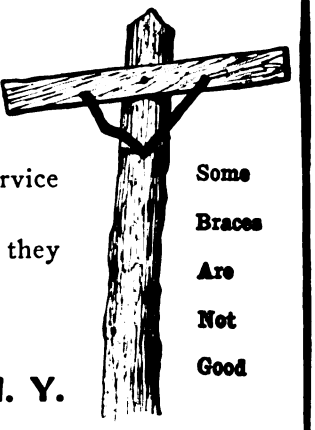


PLAIN AND GALVANIZED CROSS ARM BRACES



To protect yourself against damage suits and interference with service why not order our **Cross Arm Braces** and be sure they are right.

Our Braces are made from stiff **Bessemer Steel.** Consequently they are stronger than any other.

Let us quote you.

BUFFALO STEEL COMPANY, Tonawanda, N. Y.

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There is something wrong with that word. It isn't put together right. If you spell it backwards it will form the word "Columbia," the name of our telephones. It's just the same way with many of the telephones on the market. They have all the parts, but they are not put together right.

That's where they differ from ours.

When you buy a "Columbia" you get an instrument that is right all the way through.

You don't get a piano finish on the outside and a scrap heap on the inside.

Every part is built for efficient service under all conditions and it stays that way.

We'd like to have you write us for prices, we are sure you will never regret so doing.

We will buy your old telephones and switchboards.

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Save the Pennies!

When in need of supplies or apparatus, send a list to The American Telephone Journal.

We will communicate with leading manufacturers and dealers.

You get prices from all, and costs you only one postage stamp.

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Bare Steel and Copper Telephone Wire

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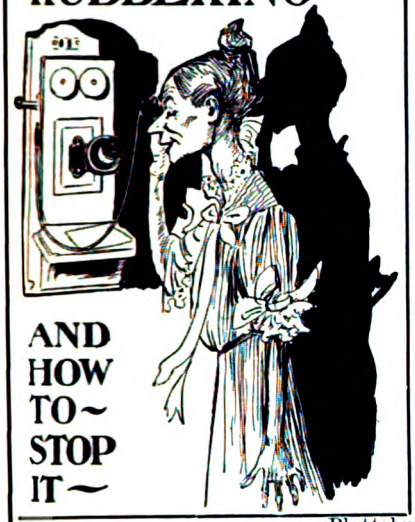
Telephone Men Tell the Truth

"RUBBERING"



AND HOW TO~ STOP IT~

Therefore we are able to PROVE That the BAIRD SECRET-SERVICE Is Sensible, Practicable, Successful and Profitable. Here is the EVIDENCE

Plattsburg, Ohio, Nov. 7, 1905.

Baird Manufacturing Co., Chicago, Ill.

Gentlemen: We have one hundred and twenty of your lock-out telephones in use. They are doing all that you claim for them and are giving us good service. We are using them on all of our party lines, and about half of these instruments have been in use since 1901. We remain,

Yours very truly,

HOME TELEPHONE CO.,

Per Carlton Henry, Manager.

Baird Manufacturing Co. 6 Michigan St. CHICAGO

THE STANDARD "HEMINGRAY"

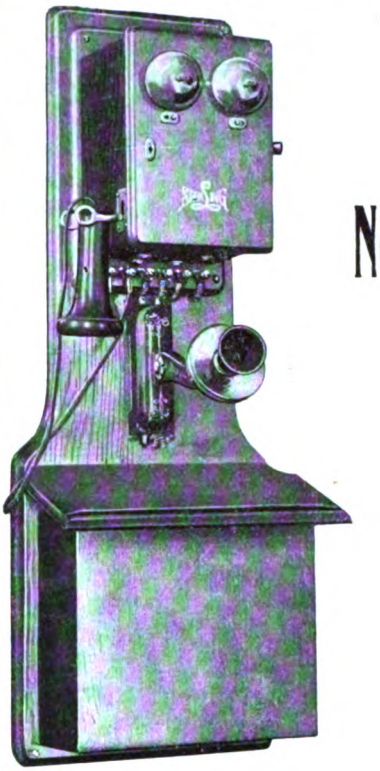
All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.

Established 1848



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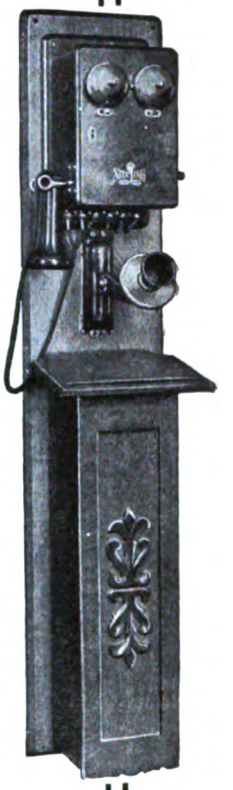

STERLING ELECTRIC COMPANY

LAFAYETTE INDIANA

No. 8

No. 18

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To Confirm Our Claim "Low Cost of Maintenance"

¶ It is always interesting to know what the user has to say about the cost of maintenance. This letter is characteristic of what the users of our Generator Call Visual Signal Switchboards have to say about this subject.

EASTERN ILLINOIS INDEPENDENT TELEPHONE COMPANY.

KANKAKEE, ILL., 9-19-05.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

Gentlemen:—In reply to yours of the 18th inst. will say we have two of your Generator Call Visual Boards in operation. One has been in use for two years and the other for one year. We are very much pleased with them. The maintenance is simply nothing. Yours truly,

A. J. VERNIER, Mgr.

¶ Next week we will tell you what the user of this type of equipment has to say in support of all our claims.

¶ If you have decided to put in Generator Call equipment, it should be an easy matter to decide what type you will use, because the board we have been telling you about *pays for itself* in a short time.

¶ Let us name you a price on a complete new exchange.

Stromberg-Carlson Telephone Mfg. Co.

General Office, Rochester, N. Y. *Branch Sales Office, Chicago, Ills.*

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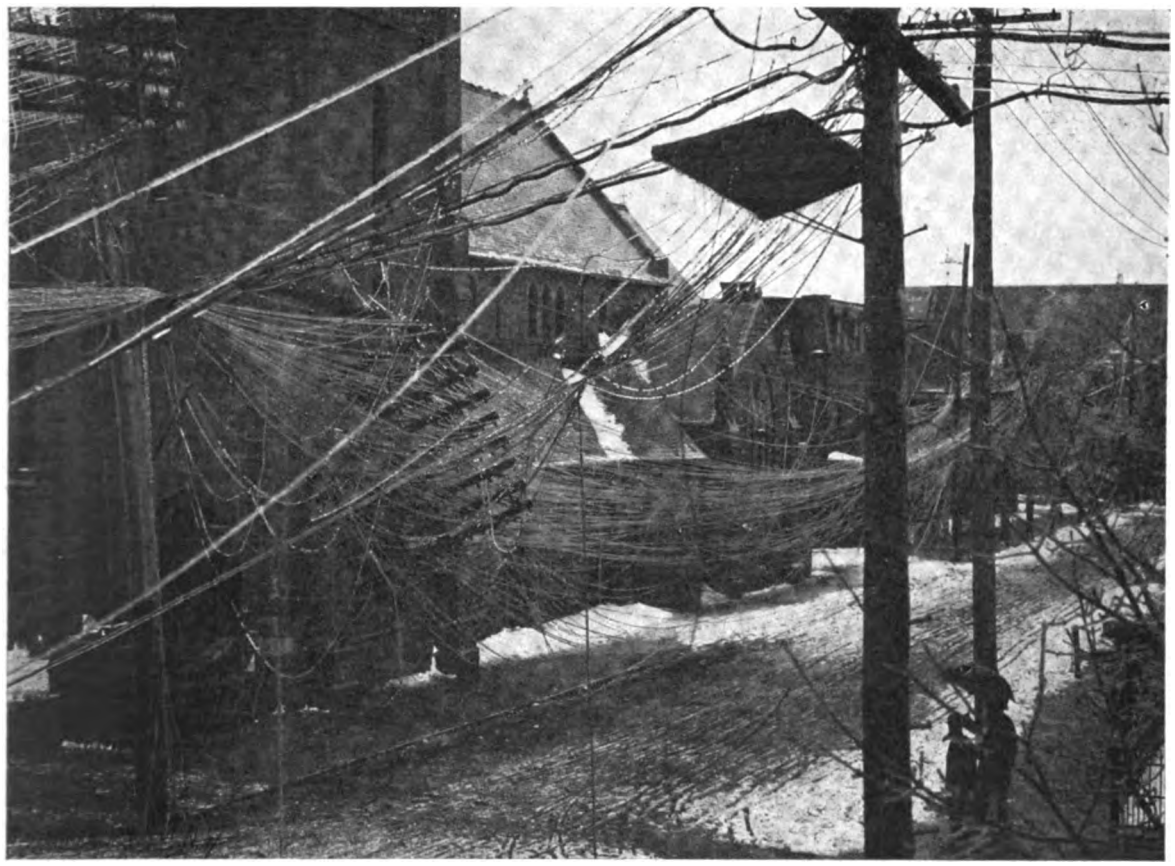
WE MAKE CABLE

No. 1--PHYSICAL DAMAGE.

Examine this picture carefully It shows two telephone leads—one cable, the other open wire.

A heavy sleet storm raged during the night and in the morning over 100 circuits were out of business. These were the open wires.

The actual physical damage is self-evident, but the feature of greatest importance is that the cables remained intact, notwithstanding the fact that they were called upon to support the weight of the tangled mass of wires, cross-arms, and tops of poles heavily coated with ice.



To repair damage such as this would cost in the neighborhood of from two to four thousand dollars, and if the lines were replaced in the original way, the same damage might be repeated with the next storm.

Open wire construction is most hazardous. Its only advantage over cable is first cost and even this will be so small if the work is done right as to be not worth consideration.

Have you any open wire lines? If so, this picture should be a sermon to you. Don't wait for the inevitable to happen, but forestall it. You can by substituting **STROMBERG-CARLSON CABLE.**

If it's cable it must be Stromberg-Carlson to be right.

No. 2--MORAL DAMAGE WILL RUN NEXT WEEK.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.	SOUTH BEND, IND.	ALBUQUERQUE, N. M.	WESTERLY, R. I.
GRAND RAPIDS, MICH.	ABERDEEN, S. D.	TRAVERSE CITY, MICH.	MANCHESTER, IA.
COLUMBUS, OHIO.	MIAMISBURG, OHIO.	AUBURN, MAINE.	PRINCETON, N. J.
DAYTON, OHIO.	LOS ANGELES, CALIF.	FALL RIVER, MASS.	RIVERSIDE, CALIF.
LINCOLN, NEB.	PORTLAND, ORE.	NEW BEDFORD, MASS.	ALLENTOWN, PA.
PORTLAND, MAINE.	VAN WERT, OHIO.	MEDFORD, WIS.	HASTINGS, NEB.
AUBURN, N. Y.	BATTLE CREEK, MICH.	SAN DIEGO, CALIF.	WAUSAU, WIS.
LEWISTON, MAINE.	CLAYTON, MO.	HOPKINSVILLE, KY.	EL PASO, TEXAS.
SIOUX CITY, IOWA.	PENTWATER, MICH.	HAZLETON, PA.	HAVANA, CUBA.
CLEBURNE, TEXAS.	TORONTO JUNCTION, CANADA.	WOODSTOCK, N. B.	MARIANAO, CUBA.
COLUMBUS, GA.	WILMINGTON, DEL.	ST. MARYS, OHIO.	BERLIN, GERMANY.

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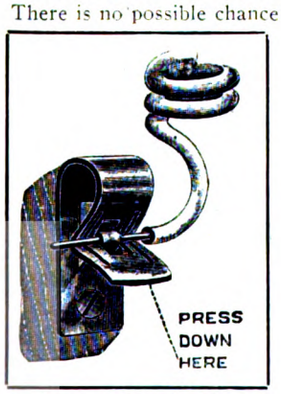
AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

DID YOU EVER?

notice that on the regular style of dry battery binding post the wires are clamped between two hard unyielding surfaces? There is no possible chance for the air to circulate around the points of contact and dry out any moisture that would tend to corrode the surfaces. If you have ever seen a



Fahnestock Spring Binding Post

you must have noticed that the contacts are made in such a way that the air can circulate all around them. Another point. In making dry batteries the post for the zinc cup is usually soldered on before the battery is filled. It is thus subjected to all the corroding action of the chemicals as well as the dirt of the factory while the battery is being made. This is not the case with Fahnestock spring binding posts. These are put on the very last thing. They are bright when they leave us. They are bright when they are put on the battery and they are bright when you get them. This insures a good clean contact surface and the spring action insures a steady pressure on the wire.

See that you get this connector on your next lot of batteries. No matter what make of battery you are using the cost to you will be no more.

FAHNESTOCK ELECTRIC CO.,

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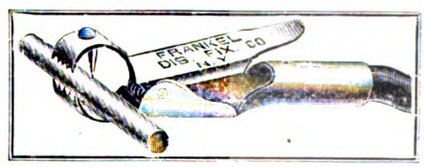

Patented Nov. 15, 1904.

Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
Lots of 100.....11.00 per 100 Lots of 1000..... 9.00 per 100

GET out of that rut of skinning the wires—IT'S EXPENSIVE. THIS device will save both valuable time and material—THAT'S PROFIT. The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

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Telephone Wire "STANDARD" TRADE MARK **and Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. ST. LOUIS. SAN FRANCISCO.

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VOLUME XIII *SATURDAY, JANUARY 20, 1906* *NUMBER 3*

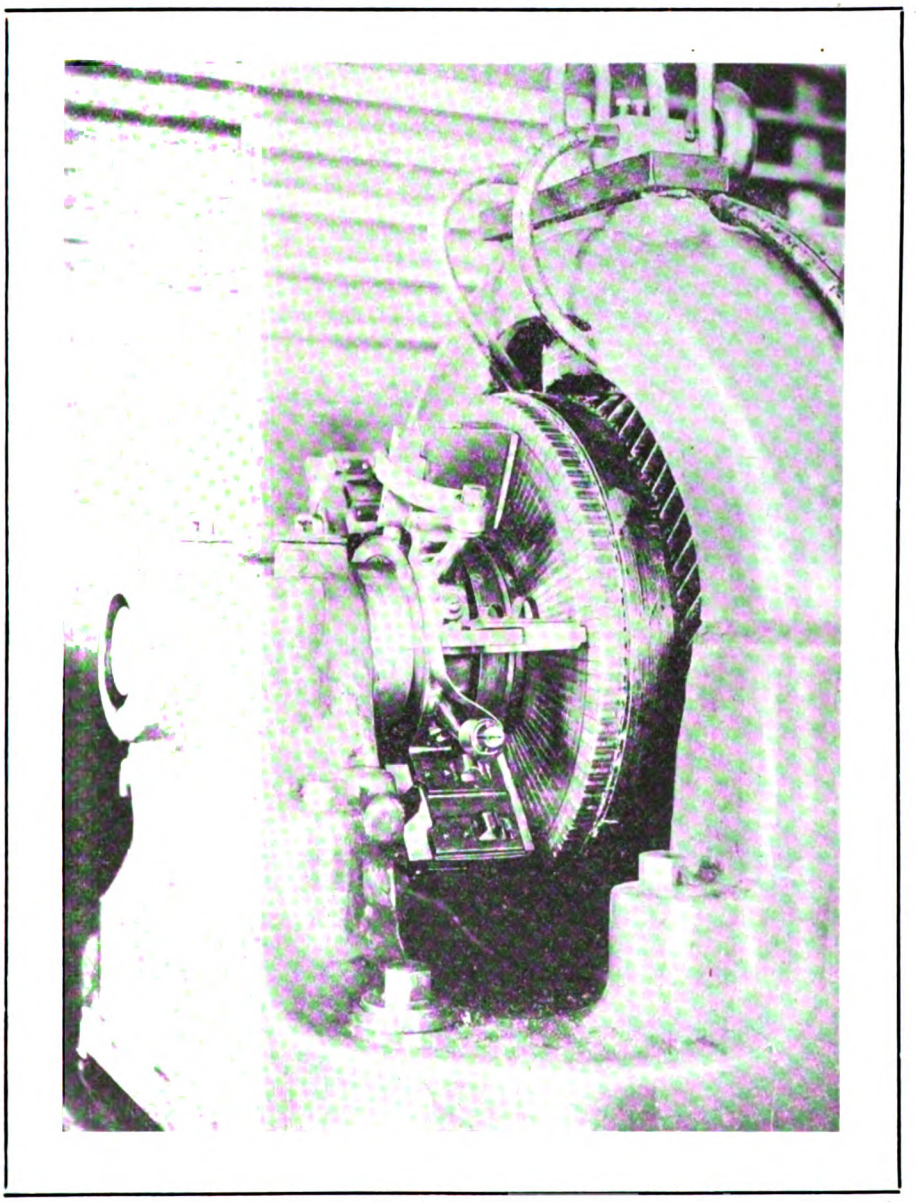
Power Installation*

By Arnold F. Pierce.

ALTHOUGH the larger part of the power consumed in the operation of a telephone exchange is that furnished in the form of a direct current for talking and the operation of relays and line and supervisory lamp signals in connection with the regular course of handling calls, the furnishing of alternating current for ringing calls for separate and special apparatus.

While hand-generators and "pole-changers" will serve every purpose of a small exchange, it is obvious that their sphere of usefulness is limited. The demands for ringing current of a large exchange are usually too constant and too heavy for the latter, and the former is out of the question entirely. The problem may be partially solved by the use of a large magneto-generator, driven by water or electric power, but in the large, modern exchange, the ringing machines serve other purposes than the one indicated by their name, and telephone engineers devised apparatus which would fulfil all their requirements.

In Fig 7 of this article there are shown the various circuits pertaining to a modern ringing machine. To the left of the diagram a motor-generator is shown, characterized as "Machine No. 1." It is a shunt-wound, bi-polar machine, working off the central office storage battery at twenty-four volts, and using from three to six amperes at full load. Its motor circuit is readily traced from the negative battery tap, through the retardation coil "RTC," the fuse and switch "s," to the negative brush "b" at the commutator. From the other brush the circuit goes back through the switch to ground. Shunted across the brushes is the field winding, with the starting-box "SB" in circuit to throw on the current gradually. The retardation coil is designed to take up the commutator hum, which might be communicated to the central office battery.



End View of Generator for Charging Batteries in Telephone Exchange. The Large Number of Commutator Segments Is a Notable Feature.

On the armature "A" there are, in addition to the motor windings, two or more windings for the generation of the alternating and pulsating currents of the generator side of the machine, the magnetic fields for these being of the same polarity as those of the motor fields. These circuits are brought out at the other side of the armature from the motor commutator, and those of the alternating current led to two rings and the pulsating currents delivered to a commutator "c." From the collector rings the alternating current is taken up by brushes and led to the "throw-over" switch "S," and the same is done with the positive and negative pulsating current. One of the brushes of the alternating collectors is grounded.

The "throw-over" switch is made up of two four-pole, double-throw jack-knife switches, arranged one above the other on the power-board, on a separate panel from the dynamo apparatus, and the ringing machine switch and starting box are placed nearby on the same panel. As shown, the switch is designed to accommodate two machines, in order to avoid any danger of failure of the power, one of these being self-contained so far as motive power is concerned, and

Continued from the issue of January 13th.

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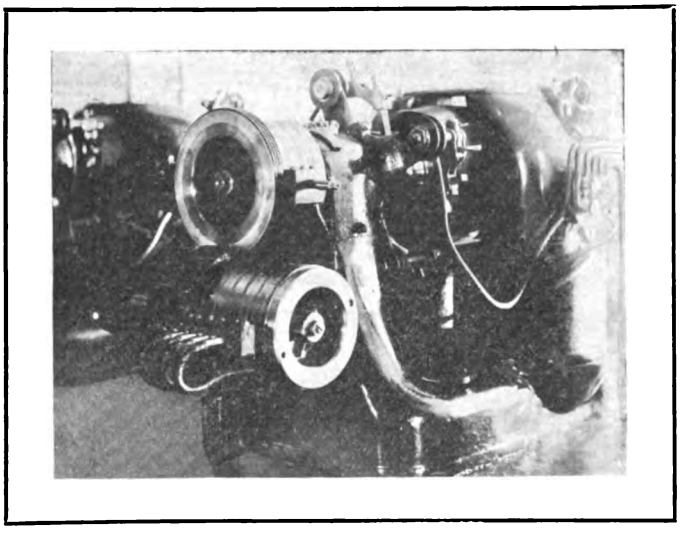
the other belt-driven by an electric motor off the power and lighting circuit of the building. From the center of the switch—the pivot of the blades—the circuits are made up into a cable and led to the fuse panel for distribution to the switchboard, etc.

Were generation of current the sole function of these machines the description would end here, but there are other features



End View of Ringing Machine, Showing High and Low Speed Interrupter Commutators.

to consider. In a large exchange, with multiple boards, "A" and "B" operators, and trunks from local relay offices and long distance and toll connections to put up and supervise, the need arose for a system of automatic signals to relieve the operators of oral supervision. If a line called for is busy, or out of order, some way must be devised to inform all the operators interested in making the connection that the line is not available. Oral information is out of the question with "B" operators in the rush hours, so "tone tests" were devised. The idea takes advantage of the humming noise made in a telephone receiver by the passage of alternating, or interrupted direct current, and by varying the periodicities of length or pulsation of this humming noise, a code could be readily arranged to inform the operator whether the wire was busy on a local call, held for long distance or toll, or out of order. It is not the purpose of this article to go into the details of how the operator receives this busy, or trouble tone in her receiver, but to confine itself to the origin of the various tones.

From a designated fuse, negative battery is taken through a wire to the ringing machine, and by means of a brush delivered to collector rings R and R'. Adjoining the ring is a commutator made up of segments of determined length of surface. The extent of surface offered to the brush collecting interrupted battery from the commutators determines the character of the tone, i. e., the tone may be short intervals of silence with a relatively long interval of noise, or it may be two intervals of noise followed by a longer one; or a short, long, and short hum. This is of course optional, but the leading telephone companies have adopted certain spacings for the different tones, so there will be no cause for confusion on the part of the operators. In the diagram, the commutator marked "h" is set aside for the howler, and the interrupted current therefrom is taken to the wire-chief's desk, to be sent on its way to attract the attention of subscribers who prefer to leave telephone receivers off the hook.

The battery current delivered to ring R' takes a different course. Passing into the commutators to right and left it is interrupted by the segements in different spacings of noise and quiet, and led to repeating, or transformer coils tc and t'c', passing through the primary windings to ground. The primary windings of these coils are .385 ohms, a sufficient resistance to twenty-four volts to do away with any other resistance coils in the circuit, and creating a powerful field about the thick core made up of fine iron wires. About this primary winding is wound the secondary, consisting of a few turns of heavy wire, with a resistance of .09 of an ohm. Unlike the howler current, the tone taken off these coils has no relays to operate, and consequently may be so small as to really produce "nothing but noise."

From these secondaries the tones are taken to the main fuse

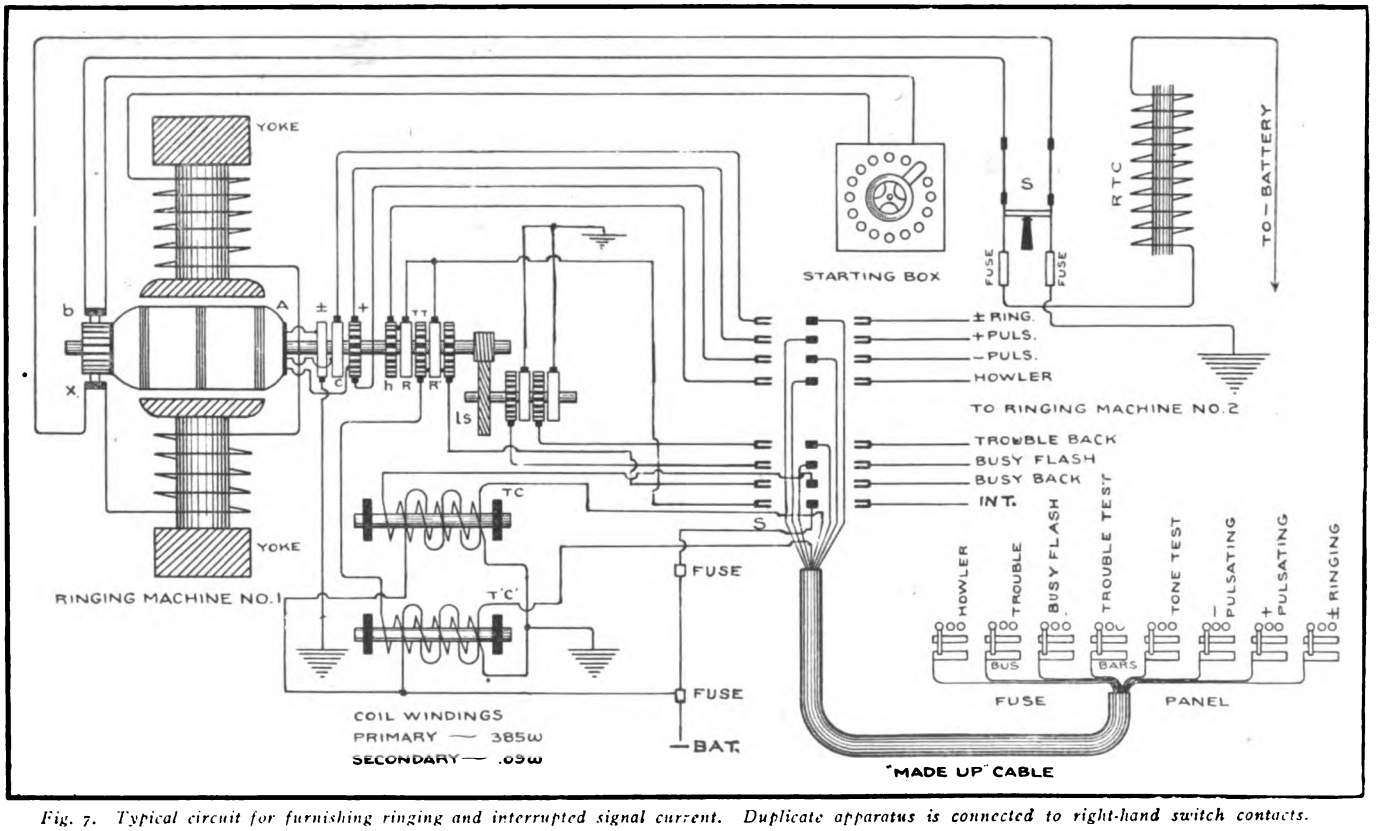


Fig. 7. Typical circuit for furnishing ringing and interrupted signal current. Duplicate apparatus is connected to right-hand switch contacts.

board, where they are designated in the diagram as "busy-back" and "tone-test," the latter being used for holding a line for toll, or long distance connection, and the former current being used to signal back from the trunk board to the calling operator at a toll switchboard when a line is busy. From the fuse board

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these wires are taken to proper terminals on the switchboards.

Having given this consideration to the high-speed interrupted current, there remains the low-speed interruptor current used for operating flash signals, etc. These signals are used to operate supervisory signals from a trunk board. As an instance of their operation it may be supposed that an operator at one exchange receives a call for a subscriber connected to another board, by a trunk and order wire from the switchboard where the original signal is received. The operator receiving this call goes in on the order wire and notifies the operator at the distant exchange of the number desired. This operator assigns over the order wire to the operator originating the call a certain trunk number. At the same time she picks up the plug in which the trunk terminates at her exchange and tests the multiple jack connected to the line of the subscriber with whom connection is desired. In the meantime the operator at the first exchange has inserted her calling plug in the jack connected to the trunk line. If the "B" operator, on testing the subscriber's multiple jack, finds that his line is busy she, instead of making the connection, inserts the plug in a special "busy-back" jack. The interrupted current connected to this jack causes the alternate attraction and release of the armatures of relays which control the supervisory lamp in the calling side of the cord to which the original subscriber is connected. Flashes of this lamp, occurring at the intervals determined by the construction of the commutator on the ringing machine, notify the operator that the desired line is busy. At the same time a characteristic noise is heard by the subscriber, and he usually understands the meaning of this noise and hangs up his receiver without being notified by the operator. A separate code is used to notify an operator that a line is in trouble. The method of furnishing interrupted current for this purpose is as follows:

Mounted on the armature shaft with the commutator described is a reduction worm-gearing, operating the shaft "ls." On this shaft are mounted two collector rings, and two commutators, delivering interrupted current to their respective brushes. With varying length of segment surface, these commutators give battery for the trouble-back, and flash signals, and as this current is to be used to operate relays, the circuit is non-inductive.

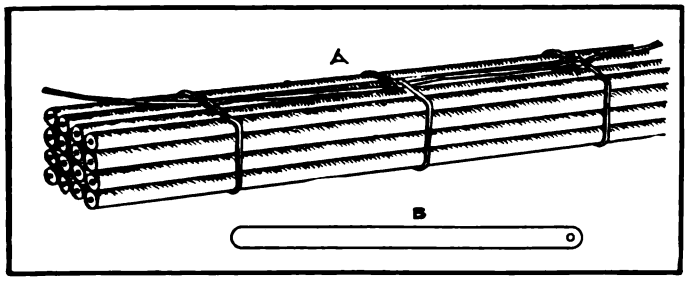


Fig. 8. Section of cable formed up and tied with so-called "Chicago" stitch.

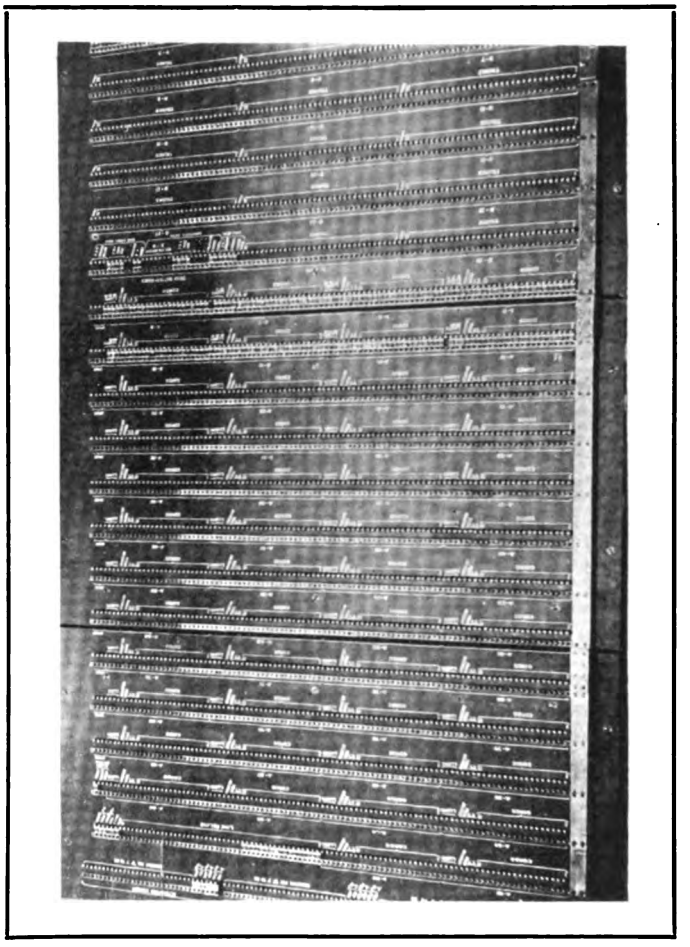
It is led through the switch as shown and delivered to the fuse panel through the cable.

The apparatus considered may be extended in its scope to take in other signal tones not spoken of in this article, and to provide for such additional equipment, there are in use in some exchanges other rings and commutators not shown on the diagram, but mounted on the high and low-speed shafts. Again, where harmonic bells are used for party-lines, the machine may generate the varying frequencies required for their operation, and the regular ringing current as well.

The idea of interrupted current and this method of interruption is said to have come from a device used by a physician for electro-therapeutic work. The idea was elaborated upon by telephone engineers, and, as shown, by means of transformers and segmentation the various tones and signals were easily obtained.

The ringing machines of a central office are usually placed upon a small table near the power switchboard. This table has framework constructed of angle irons, and a slate top. The top is drilled to accommodate bolts for fastening the machines, and to provide holes for the passage of wires.

When not in use the machines are kept covered with tarpaulin, or regular canvas machine covers. The various circuits from the power board are conveyed to the machine table in conduit, and where they appear for attachment to the brushes, terminals, etc., they are made up in a cable form. This cable formation is



Fuse Board, Not Arranged for Use of Special Alarm Fuses.

also used where the wires distribute to the "throw-over" switch, and where they come up the rear of the fuse panel to the fuse mountings. Fig. 8 shows a cable so made up of sixteen wires, "A" being a perspective view, showing a cross section. A waxed cord is looped around the wires—which are shaped into the form desired—and the free end of the cord is sewed through the body of the form, cross-wise in each direction. With these stitches placed at intervals of four or five inches and the completed cable treated to a painting with shellac, the effect is very neat. It is understood that rubber-covered and braided single or paired wires are used for all such purposes. The stitch described is known as the "Chicago stitch." A convenient needle for sewing the form may be made of a broken hack-saw blade, as shown in "B." The blade is softened, the teeth removed with a rough file, and the eye hole cut away to make a hook for the cord. Another most satisfactory needle may be made from a four-inch length cut from a steel snake One end should be heated and a hole punched to receive the thread.

With a large central office, provision must be frequently made for supply private branch exchanges with battery current, and ringing current. For the battery service, a slate panel is arranged with vertical strips of fuse mountings and terminals, with a bus-bar on the central office side to supply battery through a fuse to the terminal of the battery wire from the outside. A fuse alarm device is frequently installed on this panel to notify the attendants of any trouble.

For ringing current a similar arrangement is used, except that the current is led through a lamp resistance before going out of the central office. In both cases the ground is used for a return from the private branch installation.

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Economical Telephone Accounting and Filing Systems

ARTICLE III.—BRANCH EXCHANGE REPORTS.

*By Charles C. Wilmot, Telephone Accountant.

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THE illustrations accompanying this article show a number of forms for the making of returns on branch exchange business to the central office. Five distinct forms for this class of work have been designed. These are all of uniform size, 10¾ x 11¼, and are made in duplicate. One operation makes the general office report and the duplicate is the local exchange record. A good carbon sheet should be used and proper care exercised to have it in proper position to make a plain copy.

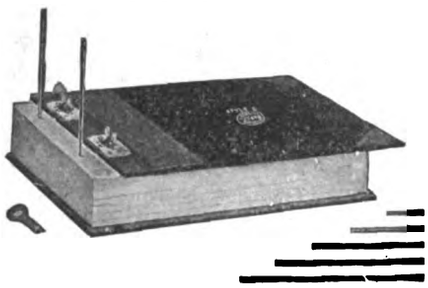

Fig. 1. Loose-leaf binder for branch exchange reports.

The original is perforated in order that it may be removed and mailed to the general office. A loose-leaf interchangeable post binder, Fig. 1, is designed to hold a number of these sheets, properly separated by tabbed sheets indexed by form numbers.

The method of filing the original reports at the general office will be taken up in detail in a later article on filing methods.

This method results in the saving of stationery, time of office force, uniformity in size of reports and the great advantage

After work for the current month has been posted and verified all carbon copies may be transferred from the original binder, Fig. 1, to a special binder holding as many sheets as can properly be inserted without making a book of unwieldy bulk. Index sheets of plain Manila paper should be used to separate the months and different forms of reports in this binder.

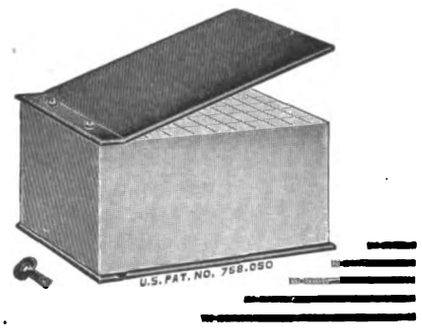

Fig. 2. Special binder for transferred sheets.

In Fig. 3 is shown a collection report sheet, form No. 75. These sheets, kept in duplicate, serve as the itemized cash book for branch exchanges and the "cash collections" report to the general office. The original is to be torn off at the perforated line and mailed in to the headquarters of the division, either monthly, weekly or daily, as the size of the exchange may render necessary. The making up of collections and cash receipts should be completed daily, by first arranging the coupons

FORM NO. G-75
(Order Blanks by this number.)

COLLECTION REPORT
OF THE

SHEET NO. _____
AUDITED _____
ENTERED _____
DATE _____

190 EXCHANGE _____ FOR _____ 190

	DATE PAID	TELEPHONE NO.	TELEPHONE RINGS	SUBSCRIBER NAMES	FOR QUARTER ENDING	LED. FOLIO	RENTAL PAID	TOLLS PAID	MISCEL'S CHARGES	REMARKS OR	CR.
1											
2											
3											
4											
5											
6											
29											
30											
31										Footings Verified by _____	

AUDITOR, GENERAL OFFICE: DATE REC'D GEN. OFFICE _____ 190

DEAR SIR: ENCLOSED FIND _____ FOR ABOVE COLLECTIONS.

DATE SENT _____ 190_ _____ LOCAL MANAGER

Fig. 3. Collection report sheet, form No. G-75. Duplicates of these sheets serve for cash accounts at the branch exchange.

obtained, without extra labor, of leaving in the possession of each local manager an exact copy of all reports for his own reference. This aids in correspondence and is of great value to a traveling auditor in his work of auditing accounts, or in case of checking up transfer or change of managers in the branch exchanges.

from rentals and toll bills for that day in their consecutive numerical order by either telephone or lease numbers, and entering them accordingly on collection cash sheets, placing the amounts of cash in the proper columns. Each credit entry is then self-indexed ready for posting by both local and general office bookkeepers. Study of the printed headings will enable an understanding of the method of making entries to be obtained. In the

Editor's Note: Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company.

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"Remarks column" should be entered any explanations necessary to keep the general office informed regarding the accounts of individual subscribers. This section has a money column in which can be inserted reports of collections for weather reports, telegrams, coupon book sales, etc. The column headed "For quarter ending" can be changed "For period, or month ending," where collections are made monthly.

and toll ledger account from this sheet. The original is to be sent each month to the general office, in order that amounts may be posted from it to the duplicate records at headquarters. The "unpaid account sheet," form No. 77, shown in Fig. 5, is used to carry a list of unpaid accounts taken from the ledger the first of each month and arranged by telephone numbers in consecutive numerical order, giving the amounts of unpaid rentals,

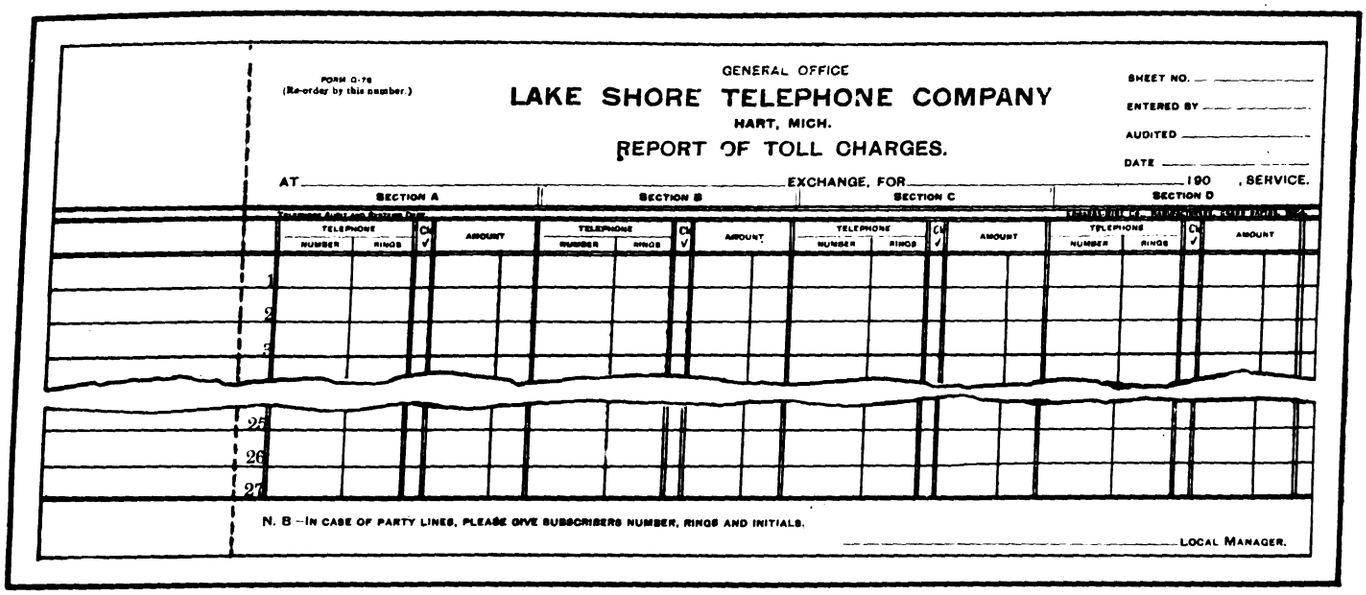

Fig. 4. Form No. G-76, for report of toll charges from branch exchange.

In Fig. 4 is shown a form, No. 76, designed for reports of toll charges. This sheet is made up monthly by posting in, from the duplicate toll bill stub, the total amount of each subscriber's toll and messenger service for the month. This list should be made by telephone numbers, arranged in consecutive numerical order, as No. 1, No. 1-2 rings, etc. Subscribers having no toll service for the month, of course do not appear on this report.

tolls and miscellaneous charges. Each column should be added separately, and its own total set at the foot. Should any list require several sheets the sheet totals can be carried forward to a sheet, using the same form, headed "Recapitulation sheet."

This list will serve as a monthly trial balance, and the original, forwarded to the general office, will enable the duplicate records at this place to be kept in balance with those at the branch ex-

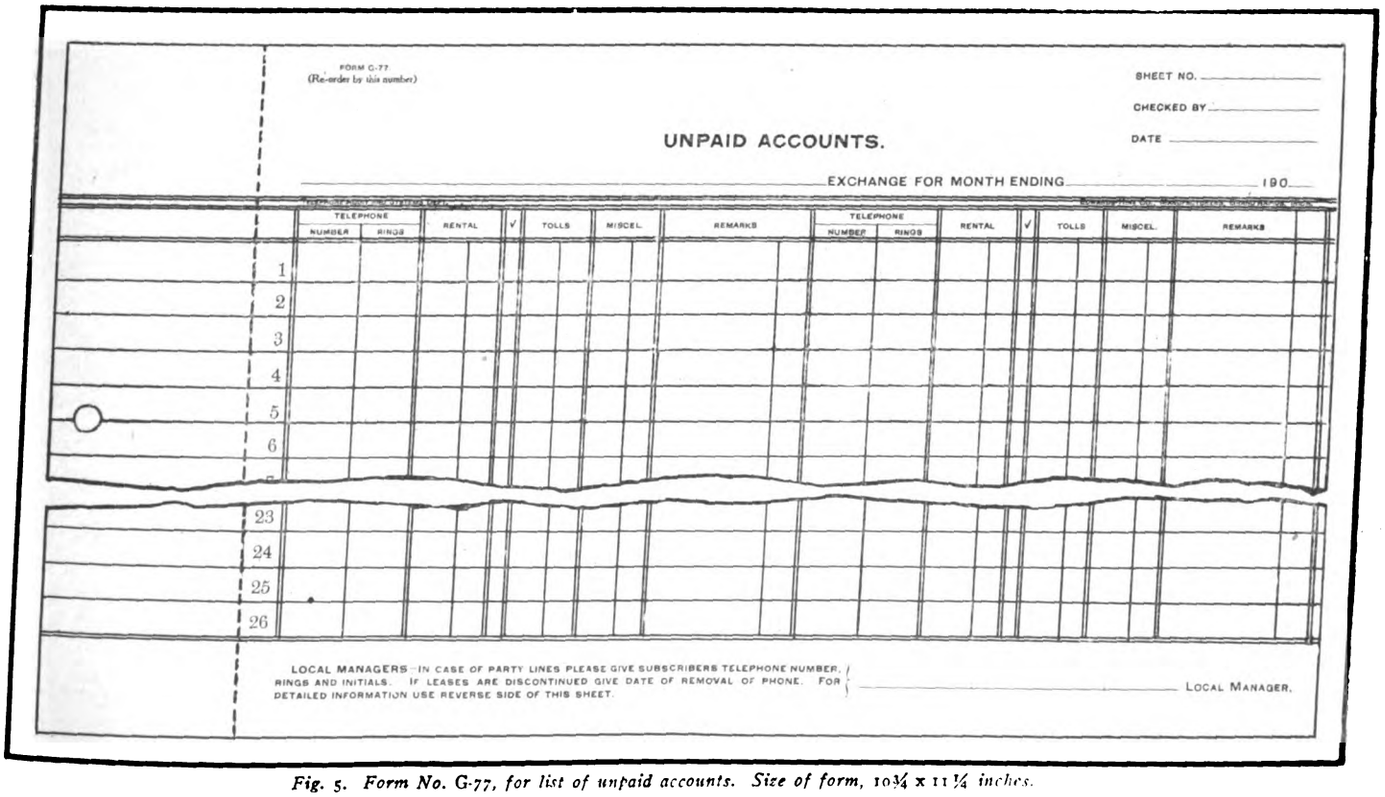

Fig. 5. Form No. G-77, for list of unpaid accounts. Size of form, 10¾ x 11¼ inches.

The total shown by this report gives the exchange earnings for monthly toll business, and is the toll journal record for branch exchanges. Amounts are posted directly to the subscribers' lease

change. Any differences will be quickly detected and adjusted monthly, thus saving confusion and unnecessary correspondence.

(To be continued.)

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Hard Drawn Copper Wire*

By T. B. Doolittle.

In recent years improvements have been made in the process of manufacture, which cover all operations from the ingot to the finished product. At the time recorded above it was the practice to roll a billet of copper, say of six or eight inches in width, into a long sheet and then, after being annealed, it was taken to a slitting machine and slit into square rods. These rods were tapered by means of a hammer, in order that they might be inserted far enough through the drawing die to be grappled on the opposite side, after which they were ready to be drawn into wire. This method of starting with a square rod had a distinct disadvantage for the reason that the corners were likely to lap and fold over in the process of drawing, thereby producing flaws or bad places in the wire, these flaws becoming more and more troublesome in the smaller sizes of wire. After having been drawn through a certain number of "holes," the surface of the wire becomes hardened to an extent which requires that it should be annealed before any further reduction in size is practicable. The new process is substantially as follows:

The copper is received from the smelting works in the form of wire bars, which are approximately fifty-four inches long, with an average diameter of about 3¼ inches, and weigh about 200 pounds each. These are delivered as commercial copper wire bars.

The first operation is to put the bars into what is termed a "continuous furnace," the bars going in at one end of the furnace and taken out at the other. In their passage through they are heated to about 950 degrees Centigrade, at the rate of about two bars per minute.

The heated bars are then put through a series of grooved rolls. Each succeeding groove being smaller, it results in a reduction of the 3¼-inch bar to a cylinder with a diameter of 5-16 inch. These are now called rods, and are taken up on a reel in the form of a coil about thirty inches in diameter. These coils are then taken from the hot-rolling department and are cold at that time. They are then plunged into a bath of sulphuric acid and water for the purpose of removing whatever oxide has been formed in the hot-rolling operation. After about twenty minutes in this solution the oxide is removed and the rods are then taken and thoroughly washed with clean water under a high pressure from a hose; after which they are immersed in a vat containing a lubricant of tallow and soap. The rods are now ready for the drawing process.

The rods are substantially drawn on what is termed by wire manufacturers a "continuous wire drawing machine." That is to say, the five-sixteenth inch rod goes in at one end of the machine, and, after passing through several dies, each one reducing the diameter and hardening the wire, it finally is drawn around a block to the finished size, say, .104".

In making this reduction, the copper is reduced in diameter from No. 1 wire gauge to No. 12 wire gauge, or, in technical terms, the wire is "eleven numbers hard." This process gives the wire the greatest amount of tensile strength possible from commercial copper and yet preserve its elasticity. The cost of production is enormously reduced by the new process. Whereas, under the old process, a very skilled workman was required for each single drawing, an attendant is now able to care for several continuous drawing machines that are run at a speed unapproachable by the old method. In the smaller sizes of wire, diamond dies are employed which, in themselves, represent a very considerable investment.

Commercial copper in its soft state has a tensile strength of about 28,000 pounds per square inch, with an elongation of about thirty-six per cent., and by the cold-drawing process above described, the tensile strength is increased by each number drawn, and the elongation is reduced; therefore, when the copper wire is drawn eleven numbers hard, it has a tensile strength of about 64,600 pounds per square inch, with an elongation of about one per cent. The wire is then taken from the wire-drawing blocks, so-called, and is carefully inspected for tensile strength, elongation, torsion and conductivity. The inspected wire is then carefully packed by wrapping each coil with burlaps, so that it does not become bruised or damaged in any way by transportation.

The cost of hard drawn copper wire fluctuates with the price of ingot copper, and at present writing is quoted at sixteen cents per pound. The relative cost of copper and iron wire, say of No. 12, is three and three-fourths cents for iron and sixteen cents for copper.

The advantage of copper over iron, besides what is shown in the table below, is that it is practically indestructible except from mechanical injury, and, if it receives mechanical injury, it can be made over into new wire at a cost of above two cents per pound, while iron, which is subject to rapid deterioration from rust, is worthless when taken down. The output of hard drawn copper wire has steadily increased from year to year.

The comparative properties of No. 12 N. B. S. gauge copper and iron wire are given in the following tables, this being the size in the largest general use as telephone toll line conductors.

No. 12 N. B. S.	Diameter in Mills	Resistance per Wire Mile 68° F. Ohms	Inductance per Pair Mile Millhenries	Effective Resistance per Wire Mile Ohms	Electro Static Capacity per Pair Mile Micro microfarods	Miles equal to 1 Mile Hard Drawn Copper for Telephone Transmission
Soft copper	104	5.1	3.66	5.1	8220	1.02
Hard drawn copper	104	5.2	3.66	5.2	8220	1.00
Iron B. B.....	104	36.0	18.00	47.0	8220	0.26

No. 12 N. B. S.	Diameter in Mills	Weight per Wire Mile, lbs.	Tensile Strength in Pounds.	Torsion in 6 inches	Elongation, per cent.
Soft copper.....	104	173	290	50-75	40.
Hard drawn copper.....	104	173	550	25-45	1.
Iron B. B.....	104	153	450	45	18.

The above figures represent average commercial conditions. The soft drawn copper wire is assumed to have a conductivity of 99 per cent. of that of pure soft copper, while that of the hard drawn is 97 per cent.

The wires of a pair are supposed to have a separation of 12 inches on centers. In calculating the inductance and effective resistances, a frequency speed (2π) of 5,000 has been taken, while assuming a permeability of 100 for the iron wire.

Much of added interest could be written were the writer to disregard the individual trade secrets that must be respected.

*Extract from article in the Harvard Engineering Magazine, continued from the issue of January 6th.

ASSOCIATION OF INDEPENDENT TELEPHONE MEN RECENTLY FORMED IN OREGON.

On January 4th there was organized in Portland a new State Association—the Oregon Independent Telephone Association. The charter membership of the new organization comprises a large number of the Independent telephone companies of the State, and the intention is to bring in all those not yet affiliated with it. They propose to work as a unit to improve the Independent service in Oregon and to fight for business against their competitor, the Pacific States Telephone Company, owner of the Bell lines.

For several years the Independent companies throughout the State have been struggling to gain an entrance into Portland and

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have repeatedly applied for franchises in this city, which have been refused. The construction of the automatic system now being installed by the Home Telephone Company has settled the difficulty. This company will be the chief factor in the new organization and will give to the other Independents the Portland connection of which they are so desirous. The extensive system which will result will be in a good position to compete with the Bell lines for long distance as well as local business.

At the meeting yesterday afternoon, which was held in the Columbia building, the following men were present: F. H. Stow, manager of the Home Telephone Company; W. D. DeVarney, who is manager of the Corvallis Telephone Company; S. G. Hughes, the manager of the Forest Grove Telephone Company; O. G. Wilkes, manager of the Hillsboro Telephone Company; J. W. Condon, manager of The Dalles Telephone Company; P. L. Brown, manager of the Silverton Telephone Company; Henry C. Chappelle, manager of the Woodburn Telephone Company; Manager A. B. Flint of the Scholls Telephone Company, and C. H. Morris, manager of the Dallas Telephone Company. There are also Independent systems at McMinnville, Albany, Brownsville, Lebanon, Scio, Stayton, Turner, Chemawa, Newberg, Dayton and Sheridan. All of these companies will be asked to join the association. In addition to these the Home Telephone Company has been granted a franchise in Eugene, Baker City and Pendleton, and these cities will also be connected with the Independent system as soon as the lines are installed.

The meeting was called at the instigation of W. D. DeVaney, of Corvallis. A constitution was drawn up and adopted, and the following officers were elected: F. H. Stow, president; S. G. Hughes, vice-president; P. L. Brown, secretary and treasurer. The executive board is composed of F. H. Stow, P. L. Brown, J. W. Condon, C. H. Morris and O. G. Wilkes. The constitution is modeled after that of the Indiana Independent Telephone Association.

The men present at the meeting represented companies owning 3,888 telephones actually in use. They are distributed among the various cities thus: Corvallis, 1,500; The Dalles, 500; Alsea, 450; Forest Grove, 430; Dallas, 258; Tillamook, 225; Hillsboro, 165; Scholls, 140; Silverton, 105; Woodburn, 95, and Beaverton, 20. It is estimated that there are about 14,000 Independent telephones in the Willamette Valley alone.

OFFICIAL BULLETIN NUMBER SEVEN OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

MAPS:

Toll line maps have been begun for Wisconsin, Iowa and South Dakota, making nine States for which maps are at present being prepared. Others will be commenced during the next month. Have you sent us that map of your lines?

"LOOK FOR THE SHIELD."

This Independent slogan suggested in Bulletin Number Five is taking with Independent companies. We recommend its general adoption in advertisements. It is catchy and to the point.

THE SUPPLY DEPARTMENT

Is still furnishing standard toll signs and printed matter bearing the "Official Shield." Are you taking advantage of it, and helping to make it a success? Illustrated catalog sent on request. Have you seen the gold plated "Official Shield" emblems? Samples 35c. each.

COMMITTEES:

A great deal of care is being taken in the selection of Committees decided upon at the last meeting of the Executive Council. The make up of these Committees will be announced later.

NEW ORGANIZATIONS:

The Oregon Independent Telephone Association was formed at Portland on January 4th.

FARMERS' LINES AS PARTNERSHIPS.

A SUIT has just been ended in the Circuit Court of Washington county, Ind., which is of considerable importance to farmers' lines throughout the country. G. W. Fritchley, Dr. Weber and B. R. Tally, of Parkersburg, had enjoined J. M. Gallagher and N. W. Byrne from removing the switch or disturbing the use of the line built from West Salem to Parkersburg in 1903, which it was claimed was part of the old Edwards' Mutual Telephone Company. Gallagher and Byrne claimed the right of control over this line and the switchboard and all other property of the old company as directors of a new corporation formed in June, 1903, under the same name and composed of considerable less than half of the old subscribers to the Edwards company, before incorporation. The Court made the injunction permanent against Gallagher and Byrne and in deciding the case held that all the subscribers to the various lines comprising the old company held either a partnership interest in the lines, or a joint interest in the lines built by the subscribers to each line. It decided that in either event the corporation, when organized, had no interest in these lines and only obtained an interest when a subscriber assigned his stock in the old company to the corporation and then the owners of interests in the old company who had not joined the corporation, were partners or joint owners with the corporation in the interests or property of the old company, and the corporation had no more right to control the old company's property than the subscribers who had not joined the corporation had to do so. Incidentally, a serious question was raised about the legality of the corporation, the complainants showing that the stock to it had been subscribed before authority to open the stock books had been received by the officials.

ILLINOIS COMPANIES CO-OPERATE IN EXTENSIVE FREE TOLL EXCHANGE.

SUBSCRIBERS to the system of the Williamsfield and Center Prairie Farmers' Telephone Company, at Williamsfield, Ill., are able to secure through traffic arrangements with many of the Independent systems in Knox, Peoria, Stark, Henry, Fulton and Mercer Counties free connections with over 20,000 subscribers. A new metallic toll line is being built to Galesburg which will be of great benefit to the farmers and merchants in the neighboring country. New construction will be taken up in the spring and a number of extensions will be built. Especial attention is being devoted to the development of rural business, and this, with the extension of trunking facilities will be an important step in the knitting together of the business interests of the whole territory served by this system of lines. The benefits of active co-operation between companies occupying adjacent territories are illustrated not only in the highly satisfactory service offered in this district, but in the gratifying growth of the company.

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THE EDITOR'S PAGE

CONSISTENT DEVELOPMENT.

TO all readers of current magazine articles the name of James J. Hill is known. Its mention brings to mind stories of his marvelous skill as a creative railroad man. His work is known as that of one who, trained and experienced in the building and operation of railroads, has from small beginnings built a system of transportation lines which is gigantic in size, and which is made to pay. His system is considered marvelous and the results achieved are truly wonderful. Yet, his methods contain nothing of the mysterious; in fact, the basic principles upon which he has founded a successful career are so simple that they may be instantly grasped by the poorest understanding. After mastering the details which enabled him to carry on the work of operating a road at a profit, his mind was opened to the possibilities of his future. With the knowledge of how to make a profit from the carrying of every ton of freight, the increase of profits was seen to depend primarily upon the increase of tonnage. Then he had reached the point where he must study methods of raising the bulk of his freight.

At this time he was provided with the foundation of a system. He had a right of way and equipment which served as a base. For the further improvement of the system there were open two lines for logical development. One of these was to increase beyond the limits of home consumption the production in regions already tapped by his lines. The other consisted in reaching centers of production of articles which would naturally follow his roads. As a corollary of the latter proposition appeared the necessity of developing these secondary centers of activity. These two separate and important problems he solved, and in so doing gave a demonstration which may well be taken as a lesson by telephone men.

Telephone lines carry messages instead of freight; but, in so far as railroad companies carry frieght to make a profit, it is clear that, if each telephone message above a certain number brings in a sum in excess of the cost to transmit it, the parallel between the two classes of business is clear. In the telephone industry the thing of prime importance is the development of the local territory. The number of people who use the telephone must be increased. After this has been accomplished there must come the extension of the distance over which each of these users will transmit messages. In considering this phase of the business one must take under advisement the existing facilities, and the possible construction of new lines.

The location of these lines is the all important factor of success. It should provide for the fulfillment of every possible business requirement which is so insistent as to demand connections taking place with such frequency as to be profitable, or which may be increased to a profitable basis of operation. It should not only provide for taking care of this business, but for the handling of it in the most efficient manner. A short line will pay better than one that does the same amount of business over a longer and more circuitous route. A line directly connecting two important centres of trade carries more traffic, even without competition, than a route requiring many switching operations. If it is easier to telephone than to dictate a letter, a man will frequently use the wire for an affair where two days' delay would not cause him inconvenience. It is, therefore, an important factor to make the telephone the greatest time saver.

The development of such routes cannot be undertaken at random. Definite results are secured only from a knowledge of exact data. Such data for Independent telephone systems are now being prepared. The maps of the National-Interstate Association will afford the firmest foundation for the profitable growth of the Independent telephone business. Each system represented reaps advantages from a two-fold source. While an individual is seeking means of reaching his neighbors, near and remote, others are looking for the shortest and easiest method of establishing connections with him. He increases his outgoing business, and his incoming tolls are doubled through the efforts of outsiders.

It is important then that each should send in data for these maps; more than this they should be forwarded at once. Every manager should tell his associates what he has to offer. He will then find himself enjoying the ideal condition obtained when business seeks the man. On the other hand, with data concerning other companies before him he will be prepared to push his business in new directions; and, from a knowledge of where to point his growth, he may shape his efforts in a manner to produce the most successful results. Every day's delay means a loss of profits, a loss which is felt by all, and by each individual alike. From the time a man sends in a plan and description of his lines he may begin to watch his business increase; each one who sees the result of the combined efforts of his associates may begin at that instant to push his work into new fields, and from the day when this takes place will date a new period of prosperity to the operator and of satisfaction to the subscribers.

A PASSING IMPRESSION.

ONE of the unique and important features of the Chicago Electrical Show is the attention which is being paid to various bodies of students of electricity and engineering. The visiting of the exhibition by large numbers of young men from various colleges and universities located within moderate distances of Chicago, will enable them to acquire a knowledge of the equipment used in various branches of electrical industries which could be obtained in no other way. Opportunities for the actual observation of practice covering the same field from many points of view rarely come to the student. It is likely that the facilities for comparison of the various features of the show will be eagerly seized by these young men, alert for new ideas and eager to put themselves in touch with the work being done by those with whom they hope soon to associate themselves. The anxiety for knowledge, and the spirit of investigation which these men will bring into evidence by their movements is likely to make them peculiarly impressionable at the time of what will, for many, be their first visit to a modern industrial exposition.

The frame of mind in which they approach the exhibition will make the reception of one of its foremost lessons almost certain. Probably the most notable feature of this show, as compared with those which have come before, is the importance and prominence of the telephone interests. These will be represented in a manner which can leave no doubt of the high place which telephonic affairs have attained in the electrical field. The idea will be strengthened not only by the predominance of this class of exhibitions, but by the high grade of engineering and mechanical skill embodied in the construction of apparatus. The establishment in many minds of a desire to join in the development of a work which can make such a strong and favorable showing is inevitable. It is probable that this attraction of men who are being trained for important positions in the future will not be the least important benefit derived from the exposition at Chicago.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

EXCLUSIVENESS NOT IMPLIED IN FRANCHISE.

In our proposed franchise the language occurs that "the city shall be entirely free to grant a franchise to another company at any time it may see fit." It is also provided that the company shall pay the city 3 per cent. of its net earnings each year. Does this not imply that the city shall not during any year it receives its 3 per cent. grant a franchise to any other company? Would it not be wrong for it to receive the percentage and then grant a franchise to another company? R. C.

THERE is no exclusive feature implied in the franchise you mention, because to assume any such tacit provision would be to construe the contract entirely at variance with the explicit provision that gives the city the right to grant a franchise to any other company at any time it sees fit. Courts never negative a specific unequivocal express provision of a contract by implying a contradictory tacit one, and they would particularly not adopt such a construction when the express provision is legal and the one sought to be implied may not be legal. Courts never favor exclusive franchises, but always bend their decisions toward free competition in trade and commerce. We do not see how it would be wrong for the city to receive a percentage and grant a franchise to another company. The percentage would be paid in return for a valuable consideration, which, in this case, is the franchise, whether exclusive or not exclusive.

RES IPSA LOQUITUR.

In your issue of January 6 you use the phrase res ipsa loquitur and say it was applied in certain cases that you cite. Will you kindly explain the meaning of the Latin phrase? L. E.

A LITERAL translation of this phrase is "The thing speaks itself." The doctrine that it designates is applied particularly in personal damage suits to a state of facts that shows the defendant to have been negligent without any further explanation of that which constitutes the negligence. For example, if the fact is that a telephone wire is down in such a way that damage results and the company must have been negligent or the wire would not have been down, it is said, "res ipsa loquitur" or "the thing speaks itself," and it is not necessary to show the details of the company's negligent conduct. It is not the editor's intention to use phrases that need explanation in this page, and he did so in this case merely for the sake of brevity.

RATE CONTRACT WHERE CITY GRANTS FRANCHISE IN RETURN THEREFOR.

THE case of Wright v. Glen Telephone Company, recently decided by the Supreme Court of New York, contains a point of general interest with regard to telephone service where a franchise has been granted to a company, based upon a reasonable consideration to serve citizens of the town granting the franchise. A citizen brought the suit, alleging that the cities of Gloversville and Johnstown were in 1900 receiving telephone service from the Hudson River Telephone Company, and that the Glen Telephone Company presented to the city council of Gloversville a petition embodying its proposed terms of service, and asking that the franchise be granted. The petition was signed at the request of the company by the plaintiff and many other citizens. The council adopted the franchise by which the company had the right to erect its line in the streets, and in consideration thereof, among other things, was to furnish the citizens' office service at $2 per month and residence service at $1 per month, the patron to furnish his own telephone. The plaintiff made a contract with the company according to the terms of the franchise, discontinuing his service with the rival company. By reason of the petition, the Hudson River Company discontinued its telephone service, got control of the defendant company and manages that company. The defendant then refused to serve the plaintiff unless he would sign a contract agreeing to pay $3.50 per month and use its telephone, refusing to continue his service under the former contract.

In deciding the case for the plaintiff upon demurrer, the court held that it was true, as the company contended, that it gets its right to pass over the streets and highways, not from the city, but by virtue of the transportation law, but this so-called franchise from the city gives the company valuable rights not secured to it by the transportation law, since that law gives the company no rights in the public parks or upon the public property or public places of the city outside of the highways. Neither does that law deprive the city of its police power under which it may determine how the lines are to run, whether upon poles or in subways or conduits. The court therefore held that there was sufficient consideration between the defendant and the city, and that the contract was binding between them.

The company further raises the point that the plaintiff was not a party to the contract between the city and the telephone company, and that the city owed to its citizens no duty of obtaining for them cheap telephone rates, and therefore the plaintiff could not maintain his action. The court overruled this contention, holding that the public places of a city are for the pleasure of its citizens, and when a city grants a telephone company the right to erect its poles in these places, interfering more or less with their use by the citizens, it is its duty to require that they shall receive services at reasonable rates. The court also held that the plaintiff, by signing the petition to the common council asking that the franchise might be granted, became a party to the contract and its consideration, and it was made for his benefit as well as for the benefit of the company and the city itself.

The court therefore held the contract between the defendant and the city and that plaintiff might insist that the defendant comply with its conditions so far as he was concerned. Wright v. Glen Telephone Company, 95 N. Y. Supplement 101.

SUES FOR DAMAGES CAUSED BY WRECKING COMPANY.

ALLEGING that the Commercial Telephone Company was wrecked and his 442 shares of stock thereby depreciated until they lost all their face value, H. M. Aubrey has entered suit at San Antonio, Tex., in the Thirty-seventh District Court against F. C. Smith and E. A. Glass, the president and secretary respectively of that company. He asks for damages in the sum of $42,200, which he alleges was the face value of the stock.

Mr. Aubrey sets out that the company was organized to operate a long-distance telephone line in the State and that in May, 1903, the defendant Smith obtained control of the majority of the stock of the corporation and caused the election of a directorate, composed of W. H. Scott, E. A. Glass, William Mann and V. I. Holcomb. He says he knows the residence of none of these directors, save Mann and Glass. The plaintiff alleges that Scott, Mann and Holcomb were not bona fide stockholders in the corporation, and that they caused improper transfers of property.

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IN THE OPERATING FIELD

FOURTH DISTRICT OF THE INDIANA INDEPENDENT TELEPHONE ASSOCIATION HOLDS MEETING.

A SPECIAL meeting of the Fourth District branch of the Indiana Independent Telephone Association was held in Lafayette on the 5th inst., Vice-President O. B. Farberg presiding, and Frank Goodwine acting as secretary. Twenty-six Independent telephone companies of the Fourth District were represented. The principal question discussed was the advisability of certain Independent companies operating in the western counties of the State to enter into a sub-license arrangement with the Bell company with headquarters in Danville, Ill., for long-distance service. The proposition was disapproved and a committee appointed to go to Danville, Ill., and arrange for Independent long-distance service, so as to accommodate the companies. It was made plain that no Independent company could join hands with the Bell company and retain its standing with the Indiana Independent Association. William Vesey, of the New Long Distance Company, of Indianapolis, addressed the meeting on the latest phases of the Independent telephone situation in the State. Mr. Vesey said the cause was never stronger nor the companies in better condition than at present. The meeting was well attended and the interest manifested showed the Independent companies of the Fourth District to be in a prosperous condition.

CUMBERLAND OPERATING WITHOUT A FRANCHISE IN PRINCETON, INDIANA.

THERE is every prospect of a telephone war in Princeton, Ind., where it has developed that the Cumberland Telephone Company has been operating for a year or more without a franchise. Since the decision of the Federal Court declaring the company a trespasser in Evansville, the city attorney of Princeton has made an investigation which warranted him in holding that the company is likewise without legal rights in Princeton. The company claims to be operating under a perpetual franchise which was granted to the old American Bell Company, several years ago, and assigned to the Cumberland people. City Attorney Brady said the court refused to uphold this proposition and has advised the city to take steps to oust the Cumberland, or compel it to seek and accept of a franchise dictated by the city. There will be strenuous times in Southern Indiana over the telephone franchise question for the next few weeks.

IMPORTANT IMPROVEMENTS TO BE MADE BY INDEPENDENT COMPANY IN IDAHO.

THE Independent Long Distance Telephone Company contemplates making improvements which will involve an expenditure of from $60,000 to $80,000 upon its plant in Boise. The new exchange and office building, now well under way, will cost upwards of $15,000, and will be a model structure for the purpose for which it is intended.

The building will be three stories in height, with a large basement. The basement will be used principally for the storage of supplies. The first floor will be divided into apartments consisting of the long distance general office of the local manager and work shop in the rear. The second floor will accommodate handsome offices for the superintendent of the company, the general manager, apartments for power plants, storage batteries, wire chief's desk and distributing frames. The third floor will be given over entirely to the use of the operating department and will be divided into reception rooms, retiring rooms, cloak and wrap room, and a spacious dining room, which will be fitted with a gas range and cooking paraphernalia, dishes and cupboard.

The new switchboard to be installed, which will cost over $20,000, will be one of latest pattern, operated by a 40-volt battery and equipped for a four-party selective ringing system. It is to have a capacity of 6,000 lines. A new switchboard and other facilities for rural lines will also be installed.

The Independent Long Distance Telephone Company is reported to have enjoyed a very prosperous year, the volume of its local business during 1905 having increased fully 50 per cent. The improved plant will afford a basis for further development which should result in greatly increasing the value of the company's service.

NO MORE FREE TELEPHONES TO CITY GOVERNMENT IN TOLEDO.

BRAND WHITLOCK, the new mayor of Toledo, who is a prototype of the deceased Mayor "Golden Rule" Samuel M. Jones, has been doing things out of the ordinary since he took his seat New Year's Day. Not only have free passes from electric and steam railroads been refused by the new mayor, not even permitting any of the city employes to use them, but he has taken a stand as to the city being furnished free telephone service. Under existing franchises, the city offices have free telephone service. Telephones were furnished to the residences of former Mayor Robert Finch, as well as other former mayors, but Mayor Whitlock will not listen to any such thing. He argues that a mayor is not entitled to free telephone service any more than any other citizen. The new mayor will pay for his residence telephones, and will furthermore make the city pay for all telephone service furnished by the Bell and Home companies. Mayor Whitlock will execute his purpose upon the basis of a recent decision made by the supreme court several months ago, in which it was decided that no city has a right to accept favors from public service corporations, such as free light or free telephones. The principle upon which this decision is based is that any favors should be shown to the general public in the way of reduced rates, so that the entire public will receive the benefit.

IMPROVEMENTS TO FOLLOW INCREASE OF RATES BY INDIANA COMPANY.

THE North Vernon Independent Telephone Company has asked the City Council for a modification of its franchise so as to permit it to increase the present telephone rates of $1 and $2, for residence and business houses respectively. Originally the telephone system in this county was owned by private individuals and a 25-year franchise with the maximum rate of $1 and $2 was fixed. Since then the property has been taken over by the Independent Company, and notwithstanding the improvements already made the company has decided to expend $17,000 in adding to its equipment during the coming year. The council is said to be favorable to the grant and if it allows the change the improvements will be made at once.

A NEW ORGANIZATION FOR THE STUDY OF MATTERS CONNECTED WITH THE TELEPHONE.

ON October 16th, 1905, there was organized at Cincinnati, O., a society for the discussion of matters which would enable the members to increase their knowledge of the problems of modern telephone practice.

At the first meeting of the society a committee was appointed to choose a number of available names for the society, of which

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one was to be adopted by vote of the members. The same committee was also empowered to draft a constitution. Messrs. Sandrock, Johnston, Lundy, Durham and Story were appointed of this committee, Mr. Sandrock acting as chairman, and Mr. Story as secretary of the committee. At a later meeting the committee reported results of its proceedings. The members voted that the society should be known as "The Cincinnati Society of Telephone Research," and the constitution was adopted as presented.

The founders of the society were elected to offices as follows: President, R. Hiltbrand; first vice-president, C. Durham; second vice-president, B. Seavers; secretary and treasurer, F. Arens; and G. Kappes was elected sergeant-at-arms. The society starts with a considerable number of enthusiastic members, representing various branches of telephone work, and there is every prospect of its being successful. The organization of bodies similar to this, for the discussion of telephone matters, should be extremely beneficial to all telephone men who wish to increase their understanding of methods of handling the work in which they are engaged.

INDIANAPOLIS TELEPHONE COMPANY OFFICIALS TAKE STEPS TO INSURE BENEFITS TO SUBSCRIBERS.

PRESIDENT STIFEL has announced the formation of a voting trust to hold the stock of the Indianapolis Telephone Company composed of H. C. Stifel, J. J. Robinson, J. S. Brailey, Jr., Breckenridge Jones, W. F. Nolker, Benjamin Altheimer, A. H. Bauer and Henry Kohler. The object of the trust is to render it impossible for any transfer of stock by death or otherwise to prevent the fulfillment of the promise of the company to expend a half million dollars in a fireproof building and other improvements in case it secures from the city permission to advance its rates.

STATE MEETING OF KANSAS INDEPENDENT TELEPHONE ASSOCIATION WILL BE HELD IN WICHITA.

A STATE meeting of the Kansas Independent Telephone Association will be held at the Carey Hotel in Wichita on January 22 and 23. Heretofore the annual conventions of this association have been held in Topeka, but this year it was decided to change the meeting place.

A large attendance is expected, it being thought that fully 250 members of the association from different parts of Kansas will be in attendance. Besides the members of the association who will be present there will be a large number of representatives of manufacturers who will have exhibits at the meeting.

A smoker will be tendered the visiting delegates the evening of the 22nd. Besides the regular business which will be transacted some important matters concerning the toll relations of the different Independent companies will also be taken up.

The officers of the association are A. E. Goddard, Topeka, president; S. M. Pearl, Hiawatha, secretary and treasurer.

NUMEROUS SPECIAL ATTRACTIONS PROVIDED AT THE CHICAGO ELECTRICAL SHOW.

ONE of the features of the electrical show which continues at the Coliseum until January 27, is "College Row." Purdue, Illinois and Wisconsin Universities have exhibits, and also Armour Institute. Purdue will send a hundred or more students to Chicago to visit the show and the University of Illinois will send the senior class of the department of electrical engineers to Chicago at the time of the exposition. Each of the spaces allotted to the universities will be decorated in the college colors.

The man who has not kept up-to-date on the subject of electricity in the household will find much of interest in this department of the exhibition. Complete kitchen equipments, including every variety of electrically-heated utensil, from a tea kettle to a griddle, are shown. The Chicago Edison Company and the Simplex Electric Heating Company exhibit complete cooking outfits, with which demonstrations are made for the benefit of the public. The Simplex Company does considerable of the cooking for the restaurant as well as the larger part of the laundry work for this department. The household devices also cover a vast number of novelties ranging from sad irons, milk warmer, curling irons, to electric heating pads which are used in place of hot-water bags. In contrast to these heating pads and devices may be mentioned the small ice-making plants which are operated by electric motors. These are suitable for small stores which carry perishable goods. A variety of medical apparatus and appliances are shown, such as vibrators and the like. The Chicago Edison Company prints a daily edition of the *Electric City* in the building throughout the exposition.

Among the most wonderful and interesting of the many demonstrations being made are the stunts that G. H. Thordarson, of Chicago, produces with 600,000 volts of electricity, making a marvelous electric spark nearly ten feet long. This is by the method known as the "high potential enormous frequency" current. For these experiments Mr. Thordarson has had specially made a sheet of plate glass weighing 700 pounds.

OHIO INDEPENDENT COMPANY USES JUBILANT ADVERTISING VERSES.

INSPIRED by the high degree of success achieved in its efforts to drive out the monopoly and make its efficient service afford the only medium of communication in the field it covers, the Hamilton Home Telephone Company, of Hamilton, Ohio, is using the following high spirited verses as advertising matter in the local papers:

WHY PATRONIZE THE
HOME TELEPHONE COMPANY.

In the year of our Lord nineteen hundred and two,
The Bell had the City, but phones were few.
The prices were high and tolls were too.
The Home began business, their service was fine,
They gave County free and installed farmer's line.

The first of the year nineteen hundred and six,
Found the old Bell in a very bad fix.
It advertised free telephones, to find out what to do,
'Twas battered and cracked, as every one knew
And our twenty-six hundred subscribers tell
The fate that awaits the poor old Bell.

HAMILTON HOME TELEPHONE COMPANY,

Contract Department, 'Phone, 900.

This presents a striking appearance on the page of the paper in which it appeared, and should afford a valuable suggestion to many companies which have built up their systems under similar conditions.

FIRE IN ZANESVILLE EXCHANGE EXTINGUISHED BY PLUCKY OPERATORS.

TWO Zanesville telephone girls are heroines by reason of their coolheadedness and practical good sense. They are Cora Ludman and Melva Gregg, employes at the Independent Telephone Company's exchange. A cross with a live wire outside sent a heavy current of electricity into the exchange, partially destroying the switchboard, burning out one of the big cables and doing $1,000 damage within a few minutes. The other girls in a panic flew down the stairs, and the males were paralyzed, but these two coolly went to a hand grenade rack, seized the extinguishers and put out the blaze before the city fire department reached the scene. The girls were found allaying the panic among the other employes of the company. The officials were highly pleased and say that the prompt action of the brave girls saved the $50,000 exchange, besides preventing possible injury to some of their fellow employes.

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QUERIES

INSULATION OF LINES.—(645.)

Will you please inform me what should be the insulation resistance of lines in a common battery exchange, where 48-volt battery is used for toll connections? C. R.

The insulation should be so high and of such quality that the resistance between opposite sides of a pair will not be less than 50,000 ohms in wet weather.

CROSS WIRING.—(646.)

I enclose a sketch of our distributing cabinet, and would like to know how lines should be cross-wired. That is, should the jumper wires run straight across from the switchboard side to the fuses on the cable side, or may they be run in in any way that we want to connect them? G. F. D.

In Figure 646 is shown a conventional representation of a distributing cabinet, arranged for the termination of the switchboard cable upon lightning arresters, and of the outside cable conductors upon fuse terminals. Jumper wires are to run between terminals on the line side of the arresters and those on the switchboard side of the fuses. Switchboard wires are numbered individually from 1 to 52, and the cable conductors are numbered in pairs from 1 to 26. In the case of metallic switchboard circuits, 1 and 2 will form a pair, and cross wiring may run from the outside terminals of the arresters connected with this pair to the switchboard terminals of any two fuses associated with the twisted cable pair, as shown by the full lines representing jumper wires. It is not necessary that the switchboard pair composed of wires 1 and 2 should be connected to pair No. 1 of the cable, as shown by the dotted lines. In fact, the sole purpose of separating the terminals, and arranging the frame for cross connections, is to do away with the difficulties introduced by direct connections of similarly numbered pairs in the outside cable and switchboard cable. Among these difficulties may be mentioned the one which occurs when either an outside cable conductor or a circuit to the jack or drop in the switchboard gets in trouble. In this case, in order to avoid interrupting the service furnished to a subscriber, it is frequently desirable to make a temporary change to a new pair of cable conductors or to a new switchboard drop. If there were no cross wiring, this could only be accomplished by unsoldering the wires from their regular terminals, and either looping them back in an unsightly manner, or making a splice in the wires, which presents almost as unsightly an appearance as the former method, and introduces a new possibility of trouble. The use of jumper wires, which may run between any required terminals, does away with this difficulty.

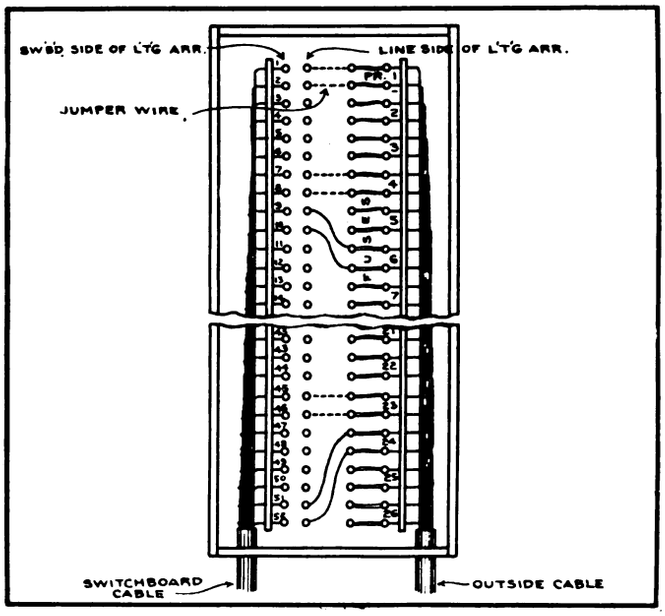

Fig. 646.

In a metallic circuit board, it is essential for the prevention of cross talk, and sometimes noise, that the twisted pairs of line and switchboard cables should be connected together; that is to say, it would not do to run No. 1 switchboard conductor to the second wire of pair No. 1 of the outside cable, and No. 2 to the first wire of pair No. 2 of the outside cable. This is called "splitting pairs," and is considered to be an evidence of careless workmanship on the part of the installer.

In case of a grounded line, one conductor of the switchboard pair is carried right through to the outside cable, while the other is grounded at the distributing box. In this case, also, a similar method of cross wiring may be used.

LOCATING WET SPOT IN CABLE.—(647.)

What is the best way to locate a wet spot in either aerial or underground cable with a bridge when all of the conductors are more or less grounded, and also where aerial wire is not available to connect up with the end of the aerial or underground? C. M.

There is at the present time no thoroughly practical method of locating water grounds in aerial or underground cable where it is impossible to employ the loop method, due to all conductors being more or less equally grounded through a water leak.

Methods exist for locating a ground where the use of a clear return circuit is obviated, but the difficulties introduced by the insulation resistance changing its value during the time of the test and difficulties existing in making simultaneous potential readings at the two extreme ends of a single wire render these methods of small utility for obtaining results of practical value.

RINGING NOISE.—(648.)

We have a small magneto switchboard which has been in use for some time. Until recently there was no trouble, but within the past few days the operator has been annoyed by a continuous ringing noise, which at times is very strong. We have tested circuits with a buzzer, and can find no cross between the ringing wires and other circuits. Can you advise us what the trouble is likely to be? L. A.

Such a trouble as you mention usually makes its appearance during a period of wet weather, and is probably due to poor insulation of ringing wires, or to dirt between key springs. To ascertain whether or not the trouble lies in the wiring it is advisable to disconnect the ringing leads both from the generator or pole changer, which ever may be the source of current, and from the ringing key straps at the switchboard. A temporary pair of wires run outside the keyboard cable may then be used as a substitute for the regular ringing leads. If the amount of noise is reduced to a negligible quantity, it will be evident that the fault lies in the wiring. The ringing leads should be examined for a point of defective insulation where they are in contact with other wires, and either have such defect repaired or replaced.

If this first method fails to locate the difficulty, it is almost certain to reside in the keys themselves. A small amount of dirt between springs will permit the passage of sufficient current to cause an injurious amount of noise. All springs and insulation should be carefully cleaned. In doing this work it would be well to examine the adjustment of keys and see that no springs are so near together that an accidental loose contact is possible.

The above method of procedure should enable you to obtain an idea of the nature of the cause of the trouble and to clear it. Such troubles are frequently very hard to locate definitely, owing to the unobtrusive character of the defects which cause them.

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TELEPHONE PATENTS

SIGNALING APPARATUS.

K. H. Poyas, Los Angeles, Cal., patents (No. 808,868; dated Jan. 2, 1906: filed July 24, 1905; serial No. 270,960½) a telephone for test purpooses.

This device is particularly adapted for a lineman's test-call apparatus for use on lines connecting with automatic systems. It consists of a receiver provided with two button switches mounted in the shell. The normal circuit of the receiver is completed through the front contacts of these switches, but when it is desired to signal, by pressing either button the side of the line to which it is attached is grounded on a plate provided with a suitable connection for securing a ground circuit. Thus in signaling an automatic station pressing one button will operate the vertical switches, and pressing the other the rotary ones, according to the respective connections to either limb of the circuit and the ground.

TELEPHONE SIGNAL SYSTEM.

Amiel R. Hoover, Pleasant Hill, Ill., patents (No. 804,848; dated Nov. 21, 1905; filed April 20, 1905; serial No. 256,592, and assigns one-half to C. J. Craigmiles, of Pleasant Hill) a telephone signal system.

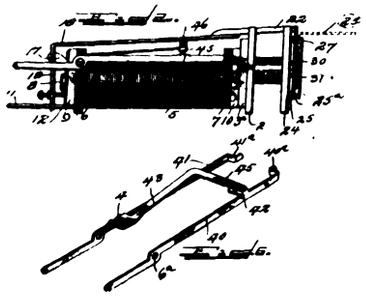
This invention relates to systems which do not require the services of an exchange for connections.

Besides the usual line circuit, connecting the various instruments on one line, there is an auxiliary pair of wires, including in their circuit, in series, a gravity battery and as many relays and closed contact switches as there are telephones. When one station desires to signal another the closed contact switch at the calling station is depressed. This opens the battery and consequently all the relays are disengaged. Their armatures then fall back and close local bell circuits. By code signals any particular station can be called by pressing the signal switch the desired number of times.

ANNUNCIATOR.

Albert Carliss, Chicago, Ill., patents (No. 808,723; dated Jan. 2, 1906; filed May 25, 1901; serial No. 61,961, and assigns to the American Electric Telephone Company, Chicago, Ill.) an annunciator signal for telephone systems.

The essential feature of this invention lies in the employment

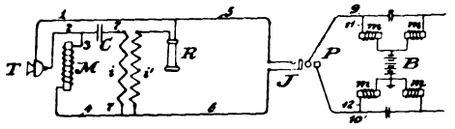


of the armature of an annunciator as a circuit closing device. Referring to Figs. 2 and 6, 5 is a magnet provided with end pole pieces 9, 10. The armature, 18, is pivoted at the point 17 and carries a stud, 46, made of insulating material. Two terminals, 40, 41, are attached to insulating blocks, 6, 7. Terminal 41 carries an arm, 43, having a right angle extension, 45, normally employed to hold the armature, 46, in its unoperated position. In this device it also serves as a contact point to engage an adjacent contact, 42. When the magnet is energized the armature is drawn downwards through the magnetic action communicated through the pole pieces, 9, 10, and besides releasing its indicating shutter closes the switch contacts, 45, 42, through the agency of the insulated button, 46. Upon de-energization of the magnet the spring member, 45, returns the armature to its normal position. By this arrangement the inventor secures the operation of the contacts on the initial movement of the armature, which may be done by a weak current, and then operate the shutter or drop on the further movement of the armature, at which time in some systems a stronger current may be available. The advantage claimed for this is that a pilot lamp circuit would be closed and indicate a line trouble which would prevent the passage of sufficient current to throw the drop.

TELEPHONE SYSTEM.

Henry A. Judge, Washington, D. C., patents (No. 809,186; dated Jan. 2, 1906; filed Sept. 9, 1905; serial No. 277,700) a telephone system.

The prime object in this patent is to increase the sharpness



and amplitude of the electrical waves set up by a transmitter. For this purpose the inventor provides a coil having a high coefficient of self induction which acts as a kick coil. The disposition of this coil with relation to the rest of the circuit is shown herewith. Lines 1, 2, 7 represent a circuit containing a transmitter, battery, and primary winding of an induction coil, *i*. Across the circuit thus completed is a bridge 3, 4, containing the electromagnet M, wound so as to have a very high coefficient of self-induction, but low ohmic resistance for continuous currents. Bridging the main line conductors 5, 6, is a receiver *R* in series with the secondary winding *i'* of the induction coil. *J* is the terminating jack at the exchange, and *P* a plug connected with a conventional source of current for central energy operation. In operation, current for the use of the transmitter flows through the coil M which is of low resistance. On account of its high self-induction, however, the variations due to the vibrations of the transmitter diaphragm are compelled to take the path through the condenser C and primary winding i of the induction coil. This causes the generation of higher potential alternating waves in the secondary circuit which traverse the lines to the distant station. Thus the currents due to the action of the induction coil are claimed to be sharpened and augmented by those passing direct to the line through the shunt path around the inductance coil M. The shunt path formed by the receiver is of a high resistance and does not appreciably diminish the supply of current necessary for the operation of the transmitter. The inventor also discloses means for adapting the circuit arrangement to local battery instruments.

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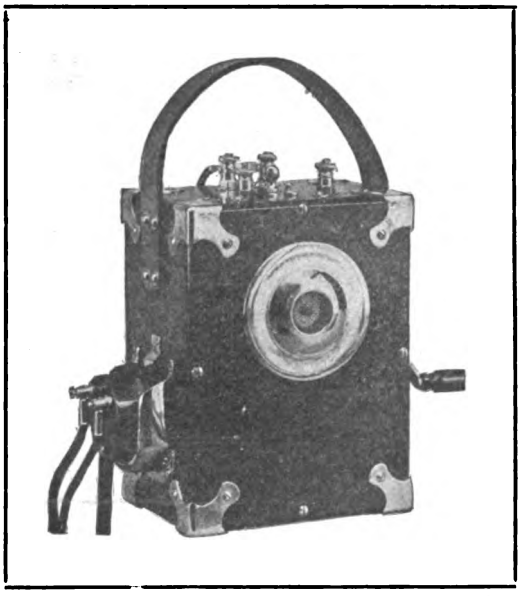
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A LINEMAN'S TEST SET.

IN many respects the ordinary lineman's test set leaves much to be desired. It is clumsy, excessively heavy, and using the receiver for transmitting, lacks clearness and reliability from the transmission standpoint. Noting these difficulties the Connecticut Telephone and Electric Company, of Meriden, Conn., has designed a test set which merits the attention of all telephone men. It is claimed to be thirty per cent. lighter than any other set upon the market. A solid back transmitter is mounted on the front surface and is furnished with current from two pocket dry cells. The ringer coils are silk insulated and are wound for either series or bridging work. The complete size of this instrument is 5½ x 7½ x 3¾. This instrument is available for use over long distances, and is suitable for testing electric light, telegraph and telephone lines as well as cable and wiring in buildings. It is in general use in the United States army. Besides its use as a test instrument it can be fitted with a cord and plug for street railway use. In this case weatherproof jack boxes are provided for mounting on poles. Further details of this instrument can be secured by writing to the company for its catalogue of test instruments.



Linemen's Portable Testing Set. Manufactured by Connecticut Telephone and Electric Company.

THE BAIRD MANUFACTURING COMPANY, Chicago, Ill., has recently issued booklet No. 101, entitled "Secret Service and What It Means." The major portion is given up to reproductions of letters from enthusiastic users of the Baird secret service system. Cuts of the selective mechanism are shown and accompanied with reading matter which sets forth the advantages of the instruments in a very clear and concise manner. The advantages noted not only apply to improvements in the service, but give reasons why the Baird system operates as an increaser of the revenue from lines on which it is placed. This booklet, together with complete information respecting the apparatus, will be mailed upon request.

THE GUARANTEE TELEPHONE AND EQUIPMENT COMPANY, of 60 West Van Buren street, Chicago, has changed its name, and will hereafter be known as the Edison Telephone Company. The firm members are exactly the same as before and there will be no change made in the policy of the company.

M. B. AUSTIN & COMPANY have removed to 133-141 West Jackson Boulevard, Chicago, in the new Continental Building. All inquiries relating to the well-known line of lock out telephones and supplies for outside construction put on the market by this company should be mailed to the new address.

THE EWING-MERKLE ELECTRICAL COMPANY, St. Louis, Mo., has published an interesting Christmas number of its Everbest Magazine. Amongst the interesting contents are some short stories which all have a moral. Two pages are devoted to hints relative to the care of motors and the fifth article upon the manufacture of incandescent lamps, dealing with baseing and final inspection affairs. In the advertising section, some interesting apparatus is listed, besides which the cards of several well-known manufacturers are given. The magazine on the whole is excellently gotten up and should prove interesting to all those into whose hands it falls.

THE STERLING ELECTRIC COMPANY, of Lafayette, Ind., has not been idle even though it has given out but little news of its doings for several months. The fact is, however, that it has been very busy filling orders for switchboards, telephones, condensers and protective apparatus. It reports its magneto-flash-light and magneto multiple switchboards as being among its best sellers with small exchange owners. The recently filled orders include large as well as small boards in exchanges located as follows: Joplin, Mo.; Los Angeles, Cal.; Buck Creek, Ind.; Toledo, Ohio; Huntington Beach, Cal.; Taylorville, Ill.; New York, N. Y.; Mayfield, Ky.; Galesburg, Ill.; Whittier, Cal.; Versailles, Ky.; Douglas, Kan.; Mars, Pa.; Winona, Minn.; Bloomington, Ind.; Clay, Ky.; Marion, Ky.; Providence, Ky.; Hawthorne, Pa.; New Philadelphia, Ohio; Tionesta, Pa.; Clarion, Pa.; Revere, Mo.; Viola, Ky.; Fancy Farm, Ky.; Manhattan, Kan.; Bolivar, Mo.; Uhrichsville, Ohio.

MATHIAS KLEIN & SONS, 79 W. Van Buren street, Chicago, Ill., have a forty-eight-page catalogue which will be mailed to any one on receipt of a two-cent stamp. This catalogue contains complete descriptions of all kinds of tools suitable for linemen, inspectors, and instrument installers. The firm has made a specialty of these tools and is therefore in a position to furnish the right article at favorable prices. One of the tools listed is a reversible combination wire and sleeve clamp which will be found of the greatest value in splicing line wires. Its catalogue number is 309, and parties interested should write for further particulars.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., reports having closed contracts for switchboards for the following places: Tremonton, Utah; Columbus, Ohio; Robinson, Ill.; Lakewood, Ill.; Chillicothe, Mo.; Garland, Utah; Holt, Mo.; Houlton, Me.; Bingham, Utah; Harrisonville, Mo.; Fulton, Kan.; Jamestown, N. Y.; Spanish Fork, Utah; Tonopah, Nev.

SEEING IS BELIEVING.

AT the Chicago Electrical Trades Exhibition, the General Storage Battery Company is showing, in addition to a full line of Bijur "High-Duty" plates and batteries, a working "Booster system" handling violently fluctuating loads while maintaining a steady load on the generator.

This is accomplished by a "Bijur" Automatic Regulator working on a new principle achieving results which will be well worth seeing. By closing the large solenoid switch on the front of the exhibition board, instantaneous loads of 2,000 amperes are

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GRAY TELEPHONE PAY STATIONS

ARE ENTIRELY AUTOMATIC

The User Has Simply to Deposit the Coins

NO LEVERS TO PUSH OR PULL IN OUR STATION

WRITE FOR OUR CATALOGUE

GRAY TELEPHONE PAY STATION CO. HARTFORD. CONN.

FOR SALE

Advertisements under this head, $1.00 for 25 words or less for each insertion. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—February 1st we will cut over the central energy and will sell all or a part of the following: Kellogg Magneto Express Switchboard, Lamp Transfers, Seven Positions, 150 numbers each; Kellogg Iron Distributing Frame, capacity 1,250 numbers, with 900 arresters installed; Holtzer-Cabot, Direct Connected Motor Generator, Charging Machine; Holtzer-Cabot Direct Connected Motor Generator, Ringing Machine; Four Cells, No. E-9 Chloride Accumulators, Marble Power Board, 900 Magneto Telephones. This apparatus is practically new, and at present in operation, giving good service. It can be seen and examined by parties interested. Address Lynchburg Telephone Company, S. H. D. Freed, Manager, Lynchburg, Va. 517.

WANTED

Advertisements under this head 25 cents for 25 words or less for each insertion. Set in bold face type $1.000 per insertion for 25 words or less.

WANTED—Position as manager of common battery exchange. Practical telephone and good business man. Have good record. Would not consider less than $100 per month. Address Box 526, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 526

WANTED—Continued.

SPLENDID opportunity for young man to take care of telephone exchange and toll lines in Mexico. References required. State full particulars in general application. Address Vought-Berger Company, La Crosse, Wis. 523

WANTED—Traveling salesman, calling on the telephone trade, who can sell an article used by every large telephone company. Address Box 519, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 519

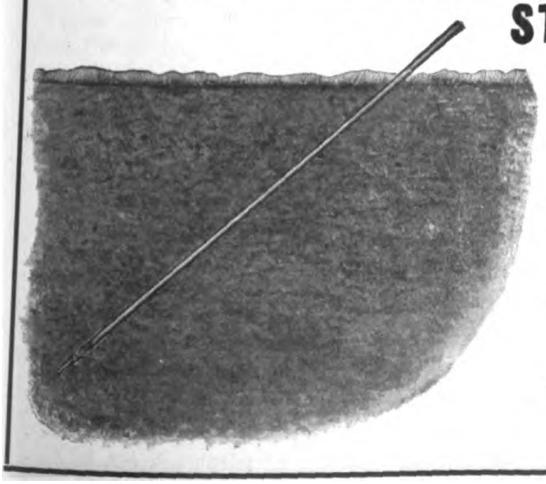
THE best resolution a man can start the New Year with, is to secure the position for which he is best adapted. Our business is to help you find that place. We may now have it among the thousands on file at the various offices in the larger cities. If your name is not listed with us, it should be. Write us for information to-day. HAPGOODS, Suite 511, 309 Broadway, New York City. 464

DRAUGHTSMEN—Large Eastern telephone company requires several young draughtsmen who letter well, as tracers and designers on circuit, map, equipment, cable and general draughting. State age, education, experience and salary expected. Enclose a sample of your free hand lettering and of your draughting. Address Box 527, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 527

WANTED—Position as manager and lineman with company of 200 or 300 telephones. Have had five years' experience and can give A1 references. Am married, steady and sober. Address Box 483, Story Co., Collins, Iowa. 528

WANTED—A manager. First class opportunity for right man. Give references, state age, experience and salary expected. Address Box 529, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 529

STRENGTHEN THOSE LEADS NOW



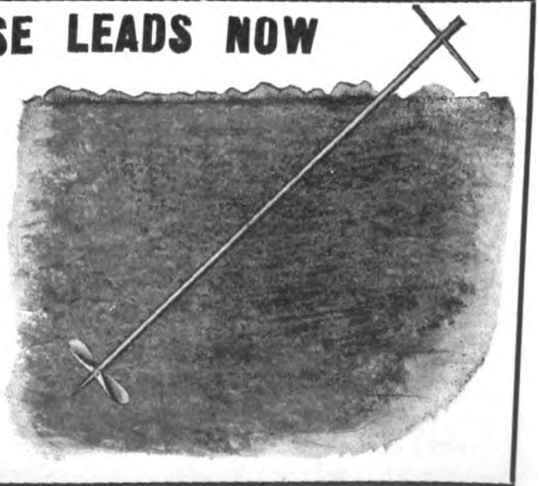
You don't have to thaw the ground. DRIVE a D. & T. Anchor THROUGH THE FROST. TWIST it UNDER the frost. We guarantee them to operate through TWO FEET OF FROST.

NOTE the V shaped eye. That is what does it.

Ask your jobber or write

The D. & T. Anchor Co.

La Crosse, Wis.



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drawn from a cell whose normal capacity is 84 amperes. By the use of the booster system there is obtained such regulation that, of this 2,000 ampere jerk, only 9 amperes, or less than ½ of 1 per cent., reach the generator. The company is also showing a full line of cells for railway and yacht lighting work, as well as its well-known type of battery for telephone service.

TELEPHONE TALK vs. JEWELRY.

AMONG the "local Edisons" in the telephone field is one Mr. Ashley McKinley, of Marissa, Ill., who devotes the greater portion of his time to hustling for Wesco telephones down in the land of Egypt. Among the many amusing stories of his experiences, he relates an incident of his recently installing a farmers' telephone line. Having connected the first two instruments on the line, he rang up from the second instrument to the first to see if they would work properly. A voice answered the call and McKinley said, "Hello! who is this?" "Jakie Spieler," came the reply. "All right, Jakie, let me have three long rings," said McKinley, wishing to know if the second station would respond properly to a signal. All was silent for some moments and McKinley began to think there was trouble in the ringer, so he rang back again to the first station and soon received a reply. "Hello! who is that?" said McKinley. "Jakie Spieler," again was the reply. "Well, Jakie, why don't you send me those three long rings?" "What!" said Jakie, "Did you leave those three rings here?—I have been out in the yard looking for them."

A BRIDGING PARTY LINE SYSTEM.

THE conditions necessary for economical operation and other features of the use of rural party lines frequently make it desirable to have a large number of telephones connected to one line. In order to increase the number of instruments which may be connected to a line, Charles A. Wardner, of Brushton, N. Y., has invented a device which is illustrated on this page.

A specially constructed switch, shown at S°, Fig. 1. placed just above the receiver switch hook, bears a rubber handle projecting from the side of the telephone, by which either the ringing circuit or the talking circuit can be changed from metallic to grounded, thus allowing one pair of telephones to carry on a conversation over the metallic circuit at the same time that two other telephones are carrying on a conversation over the grounded circuit. When properly installed and the metallic circuit kept free from ground contacts it is claimed that there will be no cross talk nor induction.

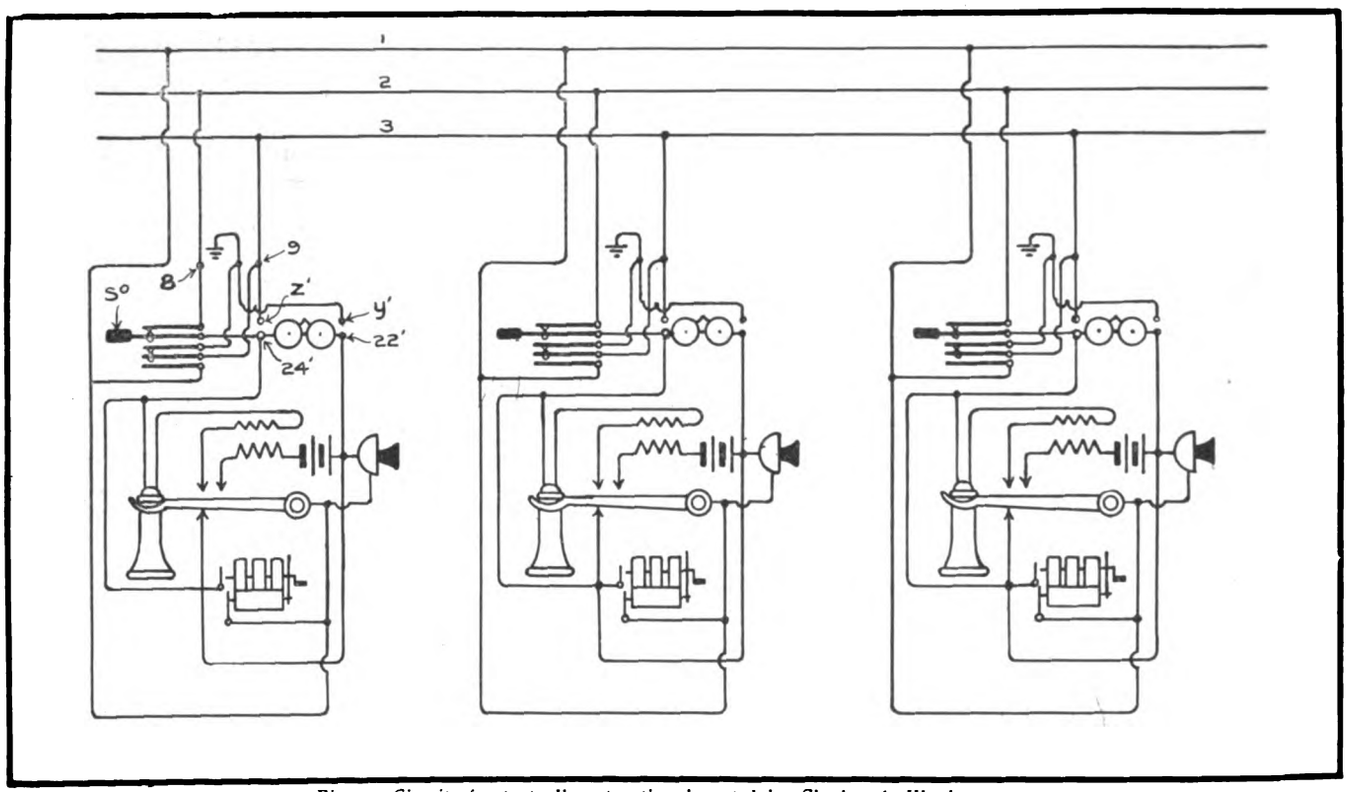

Fig. 1. Circuits for party line operation invented by Charles A. Wardner.

The inventor states that telephone instruments equipped with the special switch can be used anywhere and in any way that ordinary bridging telephones can be used. Thus a rural party line can be constructed with single wire ground system and use telephones so equipped just the same as ordinary telephones. Later on, when finances will permit, another wire can be strung, making the line metallic. The system can then be changed in two different ways: First, by leaving all ringers connected metallic, the talking capacity will be doubled, one circuit metallic and one grounded. If the line connects with a switchboard, central can be rung without ringing any other telephone on the line by depressing switch handle s° while calling central. Second, double the number of telephones can be used on the line if half the ringers are connected to ground by shifting the ringer clips 22' and 24' to contacts y' and z' and wire No. 2 is connected to both binding posts 8 and 9. Half the telephones can then be rung in the ordinary way and the other half rung by depressing the switch handle s° while ringing code signals. With the telephones arranged in this way the line can be connected to a common single wire grounded line without the use of a repeating coil. If the volume of business on the line should warrant it, both the talking capacity and number of telephones can be dou-

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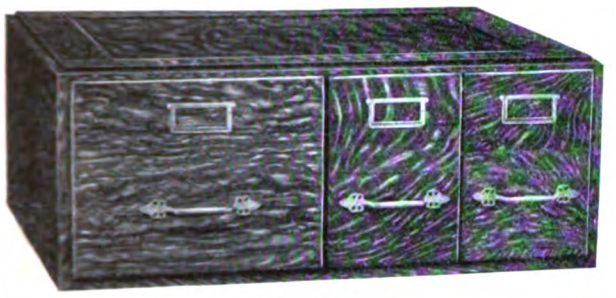

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A "Black Brother" Once

attended a sale of unclaimed express and bought a prepossessing looking sealed five gallon jug. Quickly opening it, he took a good swig but found later that the vile tasting concoction was embalming fluid. The moral is plain: don't buy until you know what you are getting.

To those who are not acquainted with our latest product we make a special proposition worth considering: We will send two of our "Leader Jr." Telephones BY PREPAID FREIGHT. After 30 days' trial they may be returned at OUR EXPENSE if not satisfactory. This offer would not be made if we did not know our quality would please.

ORDER NOW, FOR THE DELAY MEANS A LOSS TO BOTH OF US.

Central Telephone and Electric Co.

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bled by stringing a third wire as shown in Fig. 1. This wire carries grounded ringers only.

Fig. 2 shows in detail the construction of the special switch and its location in the telephone. This switch is entirely self-contained, the base being stamped or cast in one piece, one end of which forms the escutcheon for the lever. The other end carries the contract springs insulated from each other with hard rubber or mica, also from the lever, so that it forms no part of the circuit. Fastened to the inside of the telephone is a hook W with a cam face made to engage with the receiver switch

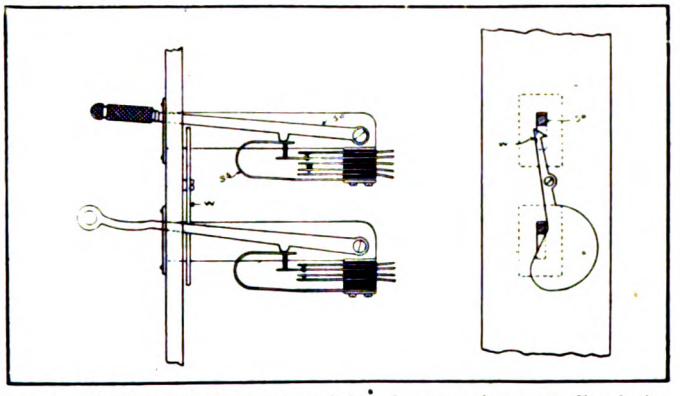

Fig. 2. Details of hook switch and key for operating party line device.

lever in such a way that when the receiver is hung up the hook end is thrown back out of the path of the switch lever s^0, thus the lever cannot be hooked down with the receiver hung up. When the receiver is removed and the switch lever s^0 depressed, the hook end will hold the lever down so that conversation can be carried on over the ground circuit, but when the receiver is again hung up the lever s^0 is automatically released and the spring s^5 causes it to return to its normal position, thus restoring the instrument to metallic connections.

AUTOMATIC ELECTRIC COMPANY REPORTS LIST OF INSTALLATIONS.

THE Automatic Electric Company of Chicago reports a most prosperous year's business during 1905, with every prospect of greatly increasing it during 1906.

The following exchanges have been completed during the past year:

PUBLIC EXCHANGES.

Name of Company.	*Place.*	*Lines.*
Home Telephone & Telegraph Co.	Los Angeles, Cal.	
West Exchange	" "	4,000
East Exchange	" "	1,000
Boyle's Height Exchange	" "	800
Highland Exchange	" "	400
Prospect Park Exchange	" "	100
Citizens Telephone Co.	Columbus, Ohio	8,000
Delmarvia Telephone Co.	Wilmington, Del.	2,000
Sioux City Telephone Co.	Sioux City, Ia.	2,000
Southern Independent Telephone Co.	El Paso, Tex.	1,500
Dakota Central Telephone Co.	Aberdeen, S. D.	1,000
Home Telephone & Telegraph Co.	Riverside, Cal.	1,000
Wausau Telephone Co.	Wausau, Wis.	700
Hastings Independent Tel. Co.	Hastings, Neb.	600
South Bend Home Telephone Co.	South Bend, Ind.	500
Home Telephone & Telegraph Co.	Ocean Park, Cal.	250
Home Telephone & Telegraph Co.	Santa Monica, Cal.	250
Citizens Telephone Co.	Cadillac, Mich.	128
Montgomery County Telephone Co.	Miamisburg, Ohio	110
Suburban Telephone Co.	Ferguson, Mo.	50
Northeastern Telephone Co.	Saco, Me.	30

PRIVATE EXCHANGES.

Brooklyn Heights Railway Co.	Brooklyn, N. Y.	109
Baldwin Locomotive Works	Philadelphia, Pa.	70
Frankford Arsenal (Ordnance Department, U. S. A.)	Frankford Station, Pa.	50
Sandy Hook Proving Ground (Ordnance Department, U. S. A.)	Ft. Hancock, N. J.	40
M. C. Lilley & Co.	Columbus, Ohio	32
Springfield Armory (Ordnance Department, U. S. A.)	Springfield, Mass.	29
Berea College	Berea, Ky.	25
Copper Queen Consolidated Mining Co.	Bisbee, Ariz.	25
U. S. Naval Station	New Orleans, La.	21
Metropolitan Life Insurance Building	New York City	12

Additions have been made to the following already completed exchanges during the year 1905:

PUBLIC EXCHANGES.

Name of Company.	*Place.*
Home Telephone & Telegraph Co.	Los Angeles, Cal.
South Exchange	" "
Boyle's Height Exchange	" "
Central Exchange	" "
East Exchange	" "
Home Telephone & Telegraph Co.	San Diego, Cal.
Home Telephone & Telegraph Co.	Riverside, Cal.
Suburban Telephone Co.	Clayton, Mo.
Mutual Telephone Co.	Albuquerque, N. Mex.
Citizens Telephone Co.	Grand Rapids, Mich.
Lincoln Telephone Co.	Lincoln, Neb.
Delaware County Telephone Co.	Manchester, Ia.
Mount Olive Telephone Co.	Mount Olive, Ill.
Stark T. L. & P. Co., Ltd.	Toronto Junction, Canada.
Union Telephone Co.	Florenceville, N. B., Canada.

PRIVATE EXCHANGES.

Calumet & Arizona Mining Co.	Bisbee, Ariz.
Arizona Copper Co.	Clifton, Ariz.
Chicago & Eastern Illinois Railway Company.	Danville, Ill.
Lucy Carnegie Estate, "Dungeness"	Fernandina, Fla.
University of Illinois	Urbana, Ill.
Watervliet Arsenal (Ordnance Department, U. S. A.)	Syracuse, N. Y.

Contracts are on hand for the following exchanges, some of which are partially built:

PUBLIC EXCHANGES.

Name of Company.	*Place.*	*Lines.*
Home Telephone & Telegraph Co.	Los Angeles, Cal.	
New Branch, Olive Street Exchange	" "	7,000
Prospect Park Exchange	" "	300
Cuban Telephone & Telegraph Co.	Havana, Cuba	5,000
Home Telephone Co.	Portland, Ore.	5,000
Delmarvia Telephone Co.	Wilmington, Del.	1,000
Consolidated Telephone Companies.	Allentown, Pa.	1,000
Consolidated Telephone Companies.	Hazelton, Pa.	400
Cuban Telephone & Telegraph Co.	Marianao, Cuba	100

PRIVATE EXCHANGES.

Berea College	Berea, Ky.	25
Stearns Lumber Co.	Stearns, Ky.	20
Stearns Lumber Co.	Yamacraw, Ky.	6

Among the developments of this system during the past year which are notable are those of the party-line system and a new trunk selector switch. This switch takes up very much less space than the first selector switch used by the company, and will admit of the installation of a multiple unit system consisting of scattered branch exchanges of one hundred lines each which can be put in the corner of a building, in the manhole of a conduit under the street, or any convenient place, leaving the main exchange in the central part of the town for trunking purposes.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, Chichicago, Ill., is placing on the market a simple device to stop the vibrations of the ringer gongs when the receiver is removed from the hook. A bent wire lever rests upon the switch hook and has two prongs provided with leather damping washers which extend through the woodwork of the ringer case from the inside of the gongs. The removal of the receiver from the switch hook tilts the lever and causes the prongs to press against the inside of the gongs, stopping their vibrations. This device is termed a Gong Damper and is furnished with all Monarch compact type instruments. As the mechanism is extremely simple there is no possibility of trouble and therefore it can be relied upon to work under all conditions. The new catalogue which this company has gotten up describes this feature as well as all other Monarch appliances and instruments. It will be mailed free to parties interested.

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Steel Foot Rest—Seat and Back Readily Adjustable to Occupant—Height of Chair Easily Regulated. Frame work made of Bessemer Steel, ⅜ (three-eighths) inch Rods twisted and interwoven. Wood work, oak, birch or mahogany finish, as preferred. Metal work heavily plated, Japanese copper finish.

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INDESTRUCTIBLE—Nothing to get Broken

24 in. high 28 in. high

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SIMPLICITY

is the Keynote of Success

A simple device which accomplishes the same results as a more complex one is certainly more preferable. The Sandwich Pole-Changer is the simplest device ever constructed for ringing purposes. There are but three contact springs and as these engage alternately with their opposite sides they cannot be forced out of position by constant use.

It requires no adjustment, as this is done at the factory and is permanent.

The use of a primary constant current battery to operate the vibrator has been dispensed with; a minute quantity of current, hardly a milliampere, being taken from the ringing battery, through suitable resistance coils for this purpose.

It will work in either a vertical or horizontal position, which permits it being hung on a wall or mounted on a cabinet. Another excellent feature is that it is practically noiseless. There are others which are described in our free booklet. Let us send it to you.

THE SANDWICH POLE-CHANGER CO.

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The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit

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FINANCIAL.

HEBRON, ILL.—The Farmers' New Era Telephone Company has declared a dividend of 9 per cent. on its capital stock of $15,000. Its capital stock has been increased to $25,000 for the purpose of extending its system.

LOUISVILLE, KY.—The Louisville Home Telephone Company on January 1st paid its regular six months' dividend of 1½ per cent., and declared an extra dividend of 1 per cent. on its stock.

RED OAK, IA.—The Red Oak Mutual Telephone Company has increased its capital stock to $15,000.

RIDGELY, MD.—The Farmers' & Merchants' Telephone Company has increased its capital stock to $25,000.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company has declared its quarterly dividend of 2 per cent.

COLUMBIA, N. Y.—The Columbia Telephone Company has increased its capital stock from $50,000 to $200,000.

FRANCHISES.

HEATH, MASS.—The Heath Telephone Company has applied for a franchise at Whately.

LONGBEACH, MISS.—The City Council has granted Richard Inglis a franchise to construct and operate a telephone system in Longbeach.

CANTON, MO.—The Citizens' Telephone Company, of Canton, Mo., has secured a franchise at Lewiston, Mo., and will install a modern system at that place.

KANSAS CITY, MO.—The Home Telephone Company, of Kansas City, has been granted a franchise at Carrollton. The company expects to spend $100,000 in installing plant.

KIRKSVILLE, MO.—Mat Muldoon has been granted a franchise for a telephone exchange in Kirksville.

NEW CARLISLE, O.—The Home Telephone Company has been granted a franchise in New Carlisle.

NEW LEXINGTON, O.—The Crooksville Telephone Company has been granted a franchise in New Lexington, O.

ROANOKE, VA.—The Virginia-Tennessee Telephone Company has secured a franchise at Roanoke, and will commence the construction of a telephone system.

COMBINATIONS.

PANA, ILL.—The Pana & Christian County Telephone Company has been acquired by the Interstate Telephone Company, of Taylorsville.

KANSAS CITY, MO.—The Home Telephone Company, of Kansas City, Mo., has purchased the telephone system at Richmond, Mo., and intends to rebuild the entire system at once. The company has also purchased the telephone system at Norborne, Mo.

MARYSVILLE, O.—All the Independent systems which are now in operation in Union County are to be combined under one head. The new corporation will be known as The Union County Telephone Company, capital $200,000, the following being the incorporators: Newton F. Liggett, Walter C. Fullington, William O. Shearer, George F. Whitney and H. E. Courtright.

BRIDGEWATER, S. D.—The Bridgewater Union Telephone Company has been acquired by J. J. Henrich, of that city.

WRIGHTSTOWN, WIS.—The Fox River Valley Telephone Company has bought the system of the Wrightstown & Western Telephone Company, operating in Wrightstown, and also having a toll line running to Freedom.

ELECTIONS.

PITTSFIELD, ILL.—At the annual meeting of the Farmers' Co-Operative Telephone Company of Pike County the following officers were elected: H. T. Shaw, president; J. F. Lacy, secretary. The company contemplates installing a central office at Pittsfield.

SOMERS, ILL.—Trustees for the Somers Township Telephone Company have been elected as follows, Martin Brownfield, three years; M. C. Busey, two years, and P. P. Dunn, one year. The trustees have elected the following officers: President, Fred Schroyer; vice president, George M. Carray; clerk, W. Schiff; treasurer, J. P. Connerty.

MUSCATINE, IOWA.—The Muscatine Central Telephone Company has re-elected the following officers: W. C. Healey, president; W. Houseman, vice-president; Joseph Gibbs, secretary; W. P. Hitchcock, treasurer. A dividend of 6 per cent. was declared.

MEDIAPOLIS, IA.—The Mediapolis Mutual Telephone Company has elected the following officers: President, Hy. Breder; vice-president, Herman Walker; secretary, J. L. Jones; treasurer, David J. Kelly.

CEDAR RAPIDS, IA.—J. M. Rider has been elected secretary of the Cedar Rapids and Marion Telephone Company.

YARMOUTH, IA.—The Mutual Telephone Company has elected the following officers: President, Charles Kurtz; treasurer, S. Koerner; secretary, John Keuchman.

NORTH BEND, NEB.—Fred A. Howe has been elected president of the Farmers' Telephone Company.

CLINTON, N. Y.—The Clinton Telephone Company has elected the following officers: President, I. H. Griswold; vice-president, B. S. Ramsay; treasurer, I. Merkel; secretary, E. L. Graul.

CONKLIN, N. Y.—The following officers have been elected by the Conklin Telephone Company: J. L. Engelbert, president; L. C. Benedict, vice-president; C. R. Webb, treasurer; A. R. Vosbury, secretary. The company expects to build a new line to Kirkwood.

ROME, N. Y.—The Rome Telephone Company has elected the following officers: President, J. S. Wardwell; vice-president, D. M. Hall; secretary, A. L. Ketcham; treasurer, C. H. Poole.

BENTON RIDGE, O.—The Farmers' Mutual Telephone Company has elected the following officers: President, A. J. Whistler; vice-president, M. H. Kirtland; secretary, J. W. Powell; treasurer, Daniel Jackson.

BRIDGEPORT, O.—The stockholders of the Belmont Telephone Company at their annual meeting elected a board of directors as follows: Hon. J. C. Heinlein, Dr. A. J. Heinlein, J. C. Dent, Hon. C. L. Weems, of St. Clairsville; Henry Schmulbach, of Wheeling; J. W. Doudna, of Barnesville, and Fred Neininger.

GRATIOT, O.—The Gratiot and Brownsville Telephone Company has elected the following officers: President, S. E. Porter; vice-president, George G. Ardrey; treasurer, G. D. Orr; secretary and general manager, C. C. Zartman.

JOHNSTOWN, PA.—The Johnstown Telephone Company has elected the following officers: President, Charles Griffith; secretary, P. F. McAneny.

BLISS, VA.—At the annual meeting of the stockholders of the Opequon Telephone Company the election of officers resulted as follows: President, C. W. Snapp; vice-president, J. W. Richard; secretary, Tilden Snapp; treasurer, J. A. R. Snapp. Dr. I. M. Brumback, T. F. Fawcet and J. B. Bywaters, with the above officers, are the board of directors.

NEW COMPANIES.

CHARLOTTE, ARK.—The Charlotte Telephone Company has been incorporated with a capital stock of $1,500. The officers are W. P. Jones, president; J. C. McGill, vice-president; C. H. Hogan, secretary and treasurer. The company will build a line from Charlotte to Batesville.

HUGO, COL.—The Lincoln Telephone Company has been incorporated with a capital of $50,000. The company will build lines into Lincoln and other places.

DONGOLA, ILL.—The Dongola Home Mutual Telephone Company, Dongola, has been incorporated with a capital stock of $2,500. Incorporators: B. P. Crabtree, Thomas R. Baugh and J. F. Karraker.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

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We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

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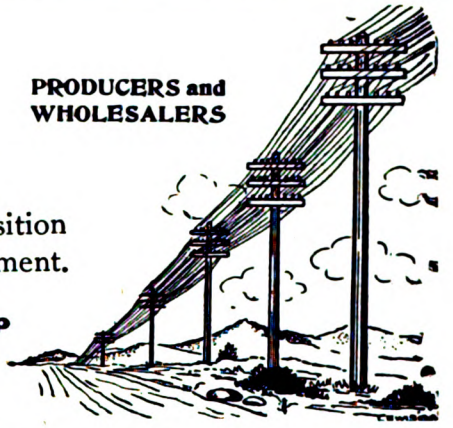
PRODUCERS and WHOLESALERS

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

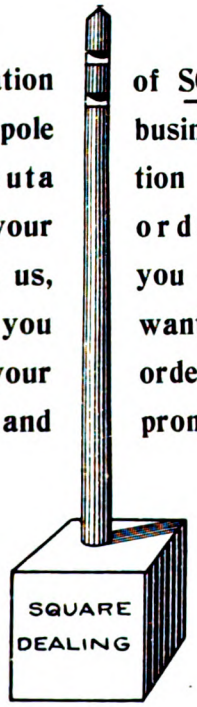
"From the Stump to the Line."



CEDAR POLES

Upon a foundation of SQUARE DEALING we have built a pole business excelled by none. Our reputation is of more importance than your order, therefore if you buy from us, you will be assured of getting what you want.

We solicit your orders and can please you in quality and prompt shipments.



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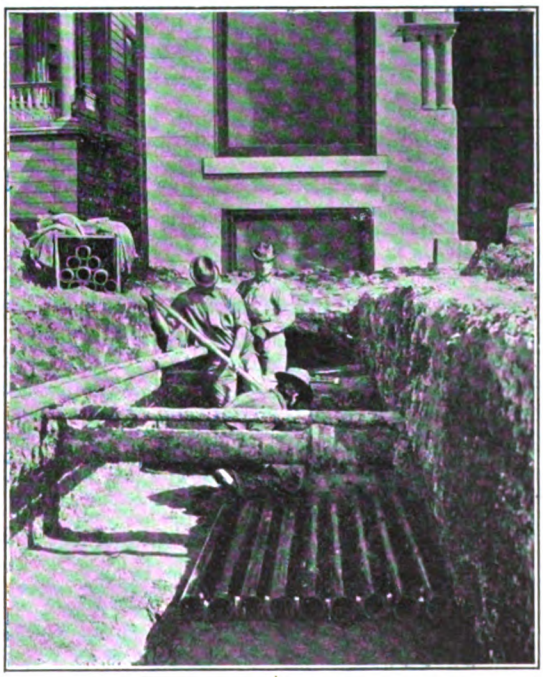
For Underground Construction



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THE WEEK'S MESSAGES

ELIZABETHTOWN, ILL.—The Hardin County Telephone Company, Elizabethtown, has been incorporated with a capital stock of $6,000. Incorporators: T. O. White, D. W. Whittenberg, Robert Thacker.

FAIRBURY, ILL.—The Fairbury Telephone Company has been incorporated with a capital stock of $20,000. Incorporators are: George O. Monk, Charles R. Monk, E. A. Agard.

SCOTSBURG, ILL.—The Scotsburg Telephone Company has been incorporated with a capital stock of $1,200. Incorporators: O. T. Hoyt, O. M. McElvain, C. R. Paul.

NORTHWOOD, IA.—The Northwood Telephone Company has been organized with the following officers: O. V. Eckert, president; C. H. Beckett, vice-president; W. A. Wiling, secretary; R. P. Johnson, treasurer.

RISING SUN, IND.—The Salem Ridge Mutual Telephone Company, of Rising Sun, has been incorporated with a capital stock of $2,500. The directors are W. A. Rockafellow, Charles Rice, George A. Woods and others.

TRAER, IA.—A Farmers' Mutual Telephone Company has been organized at Traer, Ia.

SHEPHERDSVILLE, N. Y.—The Okalona & Floyd Fork Telephone Company has been incorporated with a capital stock of $300,000. The incorporators are: W. B. Thorne, South Park, Ky.; R. W. Braithwait and G. W. Kirk, Shepherdsville, Ky.

LAKE BENTON, MINN.—The Lincoln County Telephone Company, Lake Benton, has been incorporated with a capital stock of $50,000.

ADEL, MONTANA.—The Adel Telephone Company has been incorporated with a capital stock of $10,000. The principal place of operation of the company will be at Adel. The termini of the lines are to be in the city of Great Falls and the city of Helena. The directors are: B. F. Perkins, J. W. Catron, Henry Cannon, George Hines, of Adel, and J. H. Jones, of Cascade.

ANTELOPE, NEB.—The Elm Grove Telephone Company has been incorporated with a capital stock of $5,000.

BEAUFORT, TENN.—R. A. Long, George Holmes and F. W. Scheper have incorporated the People's Telephone and Telegraph Company, with $15,000 capital stock.

DREWRYVILLE, VA.—The Courtland Emporia Telephone Company has incorporated with an authorized capital stock of $5,000. D. B. Drewry is president, and F. P. Pope, secretary-treasurer.

TUBERVILLE, VA.—The Dan River Telephone Company has been incorporated with a capital stock of $5,000.

MELROSE, WIS.—The Melrose Telephone Company has been organized with Dr. Remaly as president; J. R. McDonald, secretary; Dr. Higgins, treasurer; J. H. McCallum, manager. The company intends to build lines into Franklin, Irving and Springfield, also portions of La Crosse and Monroe counties.

OSCEOLA, WIS.—The Osceola Farmers' Mutual Telephone Company has been organized with a capital stock of $25,000. It will conduct a telephone system in Polk, Barron, St. Croix and Burnett counties, and in the State of Minnesota.

CASPER, WYOMING.—The Wyoming Telephone Company, with principal place of business at Casper, has been incorporated with a capital stock of $5,000. Trustees are: J. L. Creel, W. Y. Shaffner, E. B. Shaffner.

MILWAUKEE, WIS.—The Telephone & Telegraph Company has been organized with a capital stock of $25,000. Incorporators: Samuel E. Hall, E. A. Conway and L. J. Conway.

PERSONAL.

C. H. BUELL has been appointed manager of the Waushara Telephone Company, at Berlin, Wisconsin.

JAMES D. FIEDLER has been appointed manager of the Empire State Telephone Company's exchange at Auburn, N. Y.

JOHN E. FRASER, who has been in charge of the exchange of the Empire State Telephone Company at Auburn, N. Y., has recently been made superintendent of the new division of the Central New York & Empire State Telephone Company, which is to include the counties of Cayuga, Cortland, Ontario, Yates, Seneca, Wayne and Oswego, with headquarters in Auburn.

J. E. McGILLIVARY, formerly manager of the exchange of the Pacific States Telephone Company at Lewiston, Wash., will assume the management of the office at Walla Walla, Wash.

MISCELLANEOUS.

SIOUX CITY, IA.—The Sioux City Automatic Telephone Company has recently completed its line into Sioux Falls, which there connects with the lines of the Tri-State Telegraph and Eelephone Company. This will give Sioux City communication with the Twin Cities and points beyond.

New Construction in the Field

SAN DIEGO, CAL.—The Home Telephone Company is to construct a line from Jamacha to San Diego.

PEKIN, ILL.—The Pekin Telephone Company is constructing a new line.

KOKOMO, IND.—The Citizens' Telephone Company will spend $15,000 in improving and extending its system.

ST. JOSEPH, ILL.—The Somers Township Telephone Company has constructed a line from St. Joseph to Leverett.

ROUND GROVE, ILL.—The Round Grove Farmers' Telephone Company is installing a system at Round Grove, and is to build a line to Reddick.

WILLIAMSFIELD, ILL.—The Williamsfield Telephone Company is building a line from Williamsfield to Galesburg.

VINCENNES, IND.—The Home Telephone Company is considering the matter of erecting a building and installing new exchange equipment.

GRAND JUNCTION, IA.—The Farmers' Telephone Company is building a line from Grand Junction to Rippey.

YOUNGSTOWN, IND.—The Honey Creek Mutual Telephone Company expects to overhaul its system and build new lines in Youngstown and the surrounding country.

SIDNEY, IA.—The Knox Mutual Telephone Company is to build lines to Knox, Thurman, Percival and Hamburg.

BARCLAY, KAS.—The Barclay Telephone Company expects to make many changes and improvements in its system.

LENEXA, KAS.—The Lenexa Telephone Company has completed its rebuilding operations and will now begin to extend its country lines. The exchange has recently been moved into a new office containing new switchboard equipment.

THAYER, KAS.—The work of constructing a rural telephone line west from the town of Thayer is being carried on by John Hamlin and others, of Thayer.

LOUISVILLE, KY.—The Louisville Home Telephone Company is building at Pewee Valley and Anchorage, Ky., new exchanges which it expects to have in operation within a short time.

EGAN, MICH.—The Citizens' Telephone Company is building a line to Hamilton.

FAIRMONT, MINN.—The Fairmont Telephone Company is to build an additional farmers' line.

SWANVILLE, MINN.—The Morrison County Telephone Company is building a line from Swanville to Flensburg.

JACKSON, MO.—J. L. Boyle is to install a new switchboard in his exchange at this place. Arrangements are being made to build new lines to Chillicothe and Trenton.

SEWARD, NEB.—The Seward County Telephone Company is to build a line from Seward to Milford.

PLYMOUTH, N. H.—The Plymouth & Campton Telephone Company is to build additional lines.

DOUGLAS, N. Y.—The Douglas Telephone Company expects to extend its lines to La Prele and Box Elder settlements.

FRANKFORT, N. Y.—The Frankfort, East and West Schuyler Mutual Telephone Company contemplates making many improvements and additions to its system.

PARISH, N. Y.—The Ontario Telephone Company, which has just completed a line to Dugway, expects to build several additional lines.

MANDAN, N. D.—The Mandan Telephone Company expects to spend a large sum of money in improving and extending its system.

ARCADIA, O.—The Arcadia Telephone Company is building a toll line to Van Buren.

NEY, O.—The Ney Telephone Company contemplates building several new lines on the territory adjacent to Sherwood.

CORNELLSVILLE, PA.—The Somerset County Telephone Company is extending its lines to New Lexington.

WAYNESBURG, PA.—The South Penn Telephone Company, of Waynesburg, has recently completed the construction of a new line to Old Concord.

PORT LAVACA, TEXAS.—Messrs. Sol Marsh, John Deck and M. J. Davis are planning to install a new telephone system in Port Lavaca. A new switchboard will be installed, and a new line constructed between Port Lavaca and Victoria.

COX'S LANDING, W. VA.—The Cox's Landing Telephone Company is to build a line to Guyandotte.

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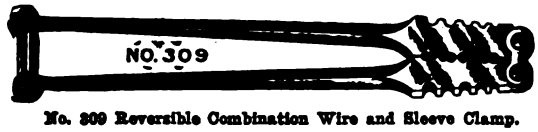

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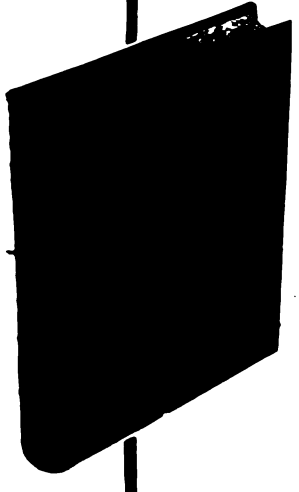

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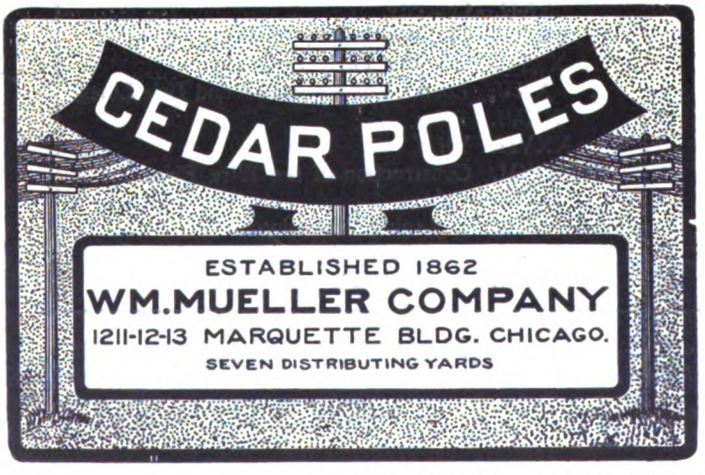

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This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

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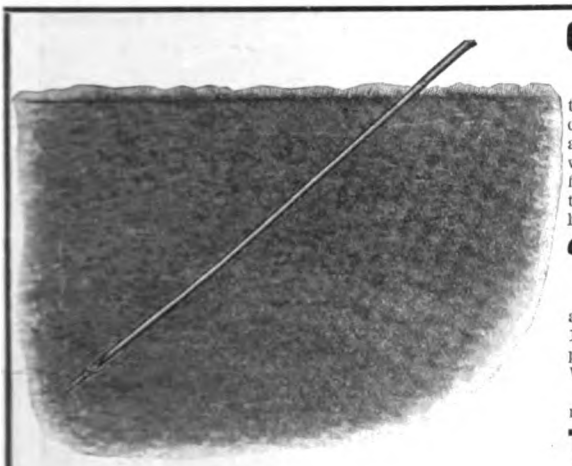

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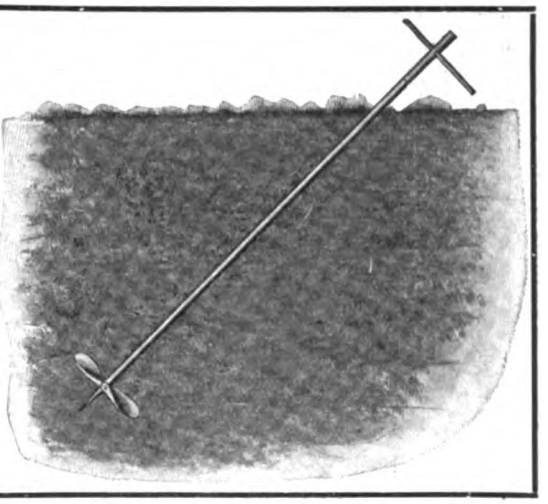

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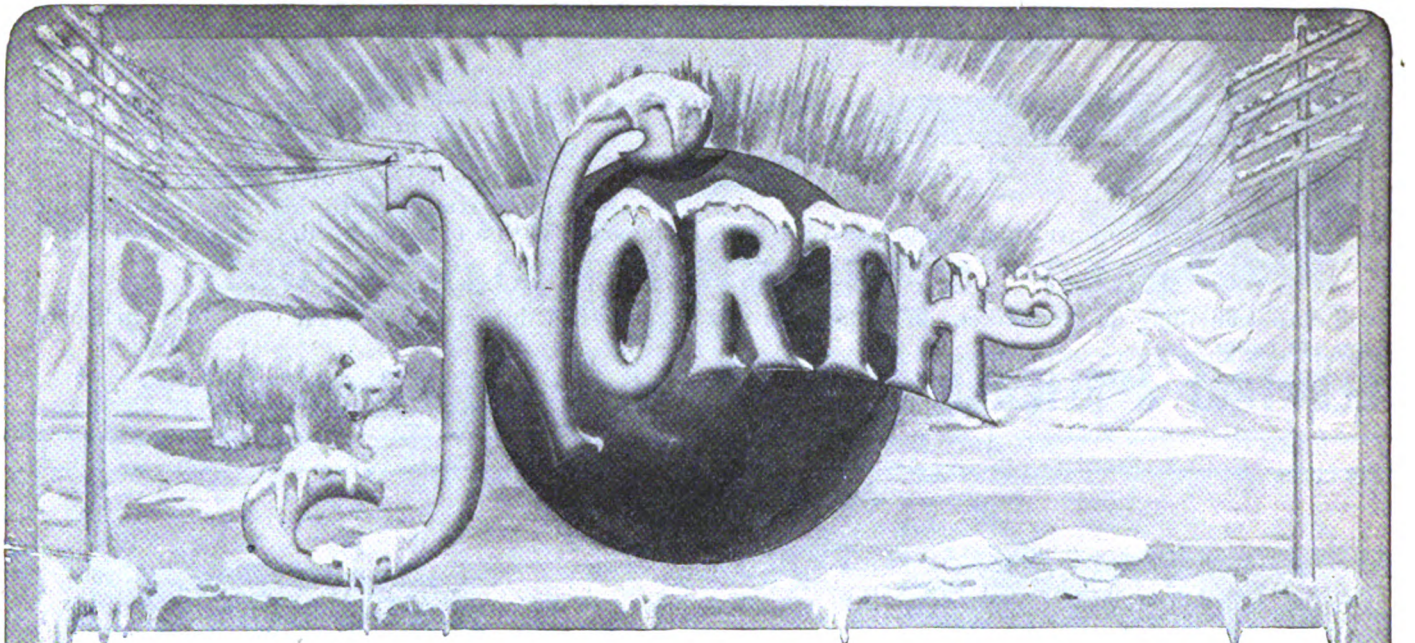

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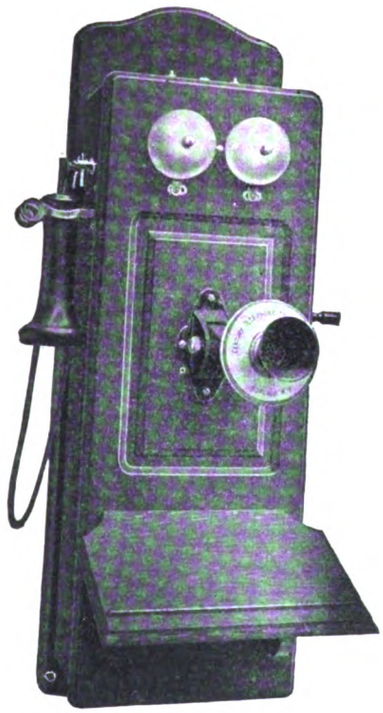

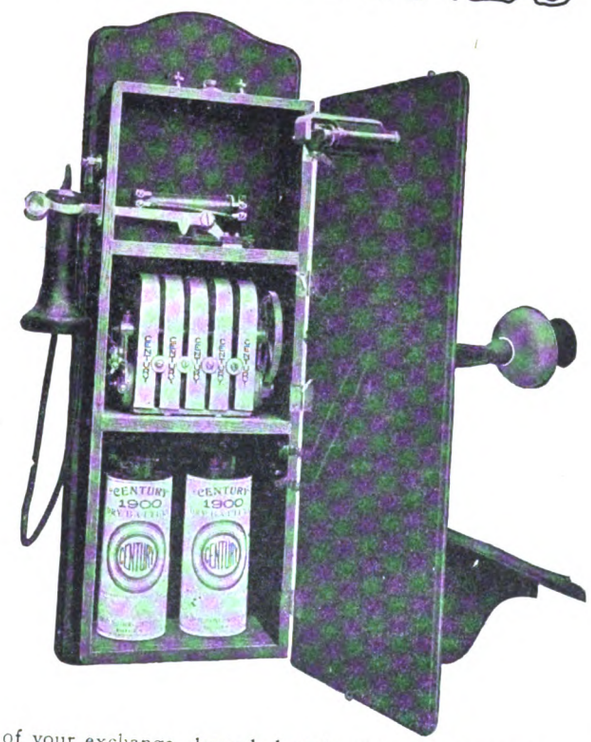

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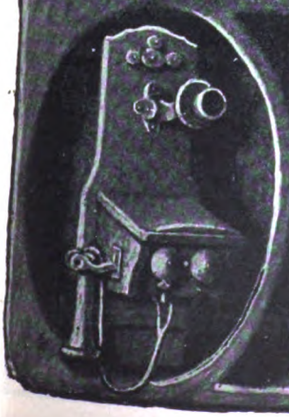

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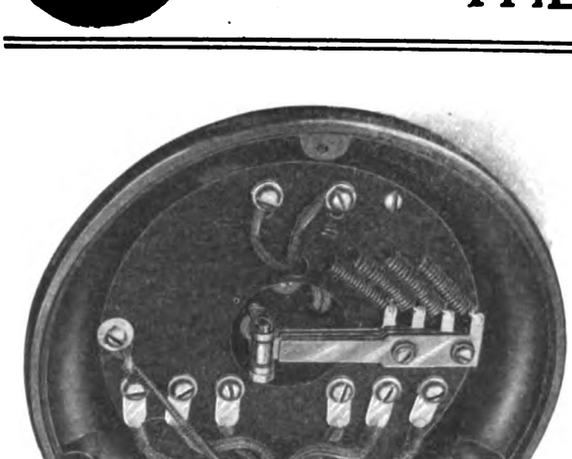

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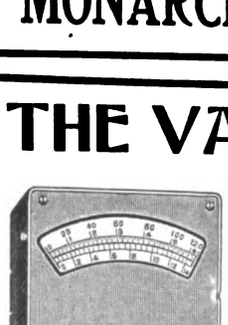

Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

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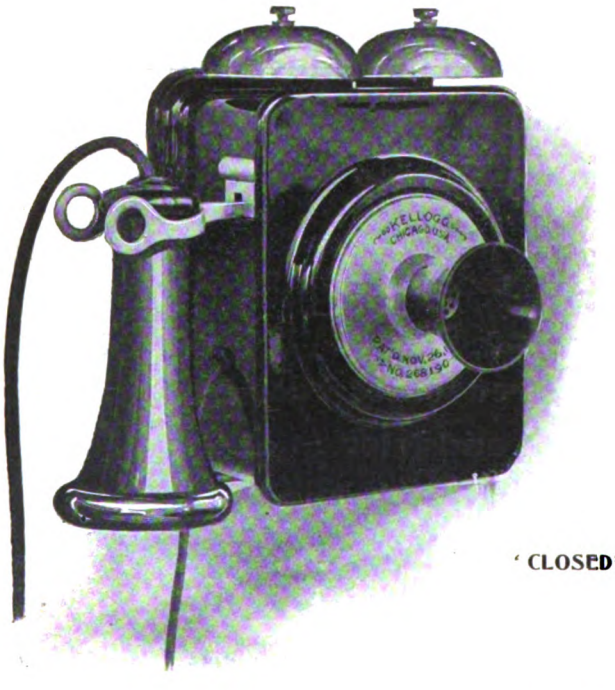

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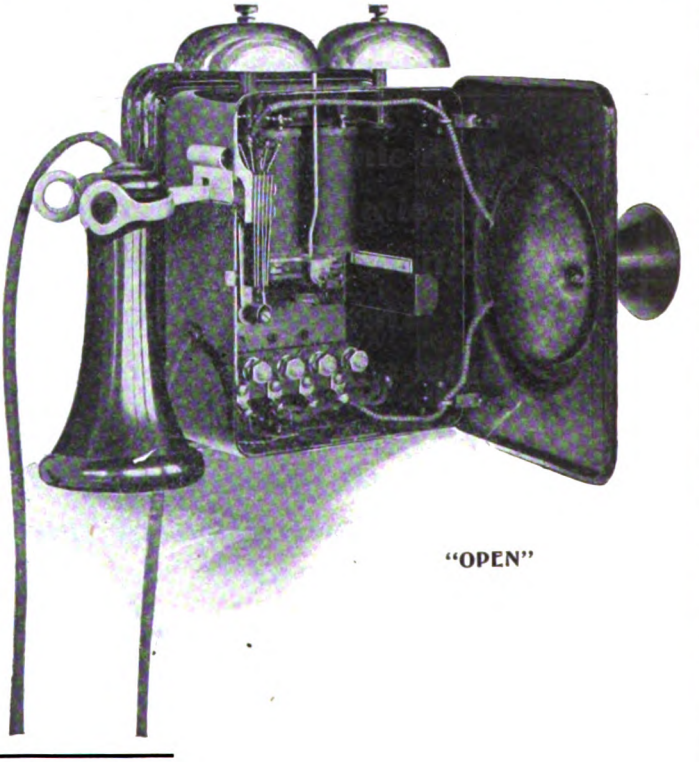

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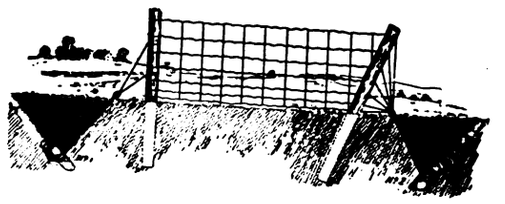

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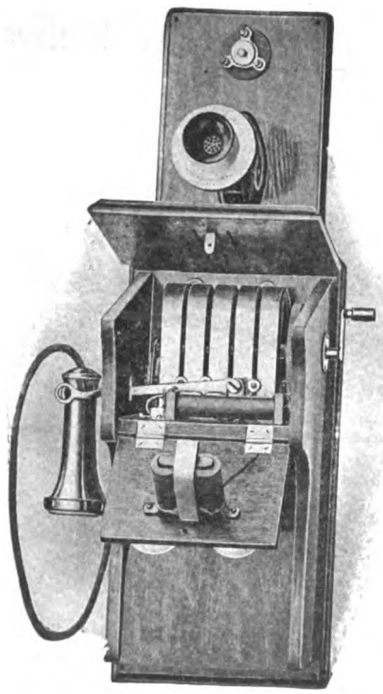

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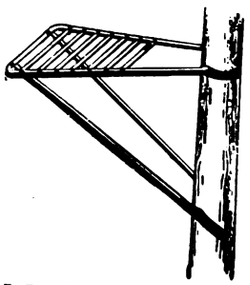

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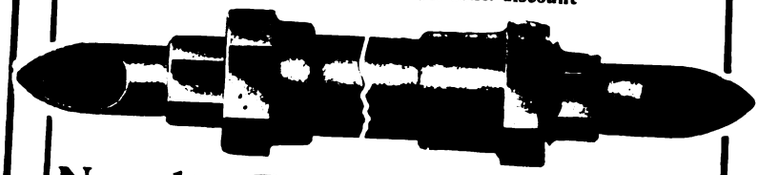

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Expert Cable Men Not Needed

Simple, can be inspected and replaced any time without injury to your cable joint.

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is put up ONE PIECE ONLY per spool.
The insulation is absolutely UNIFORM, CONTINUOUS, and of CORRECT THICKNESS.
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We have 20,000 pounds of fine sizes of wire IN STOCK for immediate delivery.
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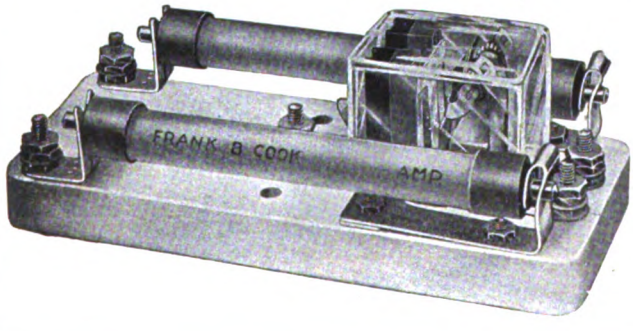
Absolutely protects your instruments against lightning and against both strong and sneak currents.



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Evidence Accumulating Daily

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BAIRD SECRET-SERVICE

Is most popular where best known.

Up-to-date exchanges all putting it in.

Read this one.

DEFIANCE, PA., EMPORIUM, PA., Nov. 4, '05.

Baird Manufacturing Co., Chicago, Ill.

Gentlemen—We have nine of your "Secret Service Telephones" operating on a twenty-three mile toll line, and beg to advise that they are giving absolute satisfaction.

The writer has always been rather skeptical regarding "Lock out" systems, but the operation of these certainly leaves nothing to be desired. Resp'ly,

GEO. METZGER, JR., Mgr.

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Service is the Only Test for Dry Batteries

The 1900 gives a large current and has long life, shows great recuperation and practically no internal action.

A test will convince you that the 1900 will save you money and save you trouble.

A test is inexpensive.

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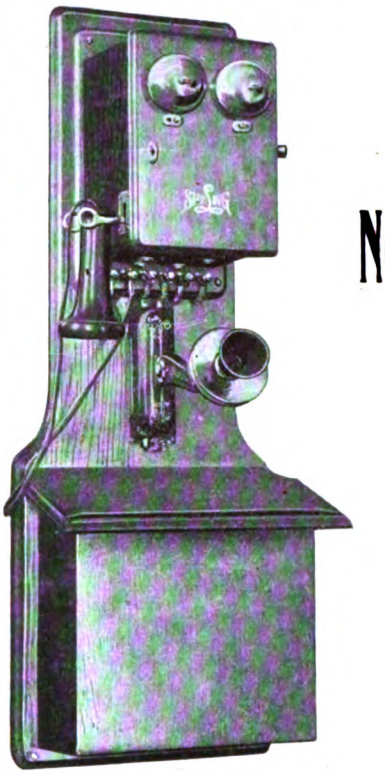

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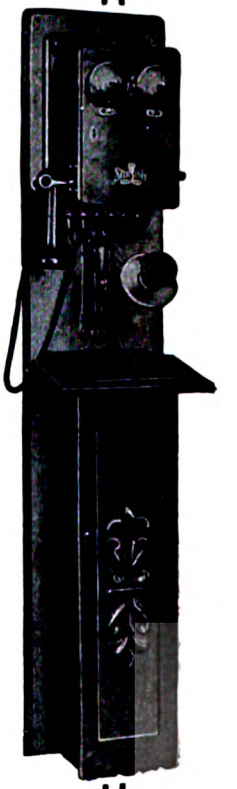

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Evidence to Prove All Our Claims

for the Generator Call Visual Signal Switchboard, we have been telling you about the last few weeks.

CITIZENS' TELEPHONE COMPANY OF LAWRENCE CO.

LAWRENCEVILLE, ILL., 9-17-'05.

Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.

Gentlemen: Replying to your favor of the 16th inst., I am pleased to advise that the Visual Signal Switchboard purchased from your company, a little over a year ago, for our Summer exchange is giving perfect satisfaction. In view of the almost extravagant claims you made for it, I expected to be disappointed in some of the particulars, but the only disappointment met with so far is that the board has fulfilled every promise you made for it.

Wishing you much success, I am,

Yours very truly,

G. H. CUNNINGHAM, Mgr.

What better evidence do you want that this is the switchboard for you to buy, than facts of this kind from the user? If you could have an opportunity to see one of these boards operate, you wouldn't want any other evidence to prove its high quality. There are a good many of them in use. Maybe there is one in your territory to which we can refer you.

Let us mail a copy of our bulletin and quote you prices. Remember we have standard cabinets of 60, 70, 100, 140, 180 and 200 lines.

Stromberg-Carlson Telephone Mfg. Company

GENERAL OFFICE
ROCHESTER, N. Y.

BRANCH SALES OFFICE
CHICAGO, ILL.

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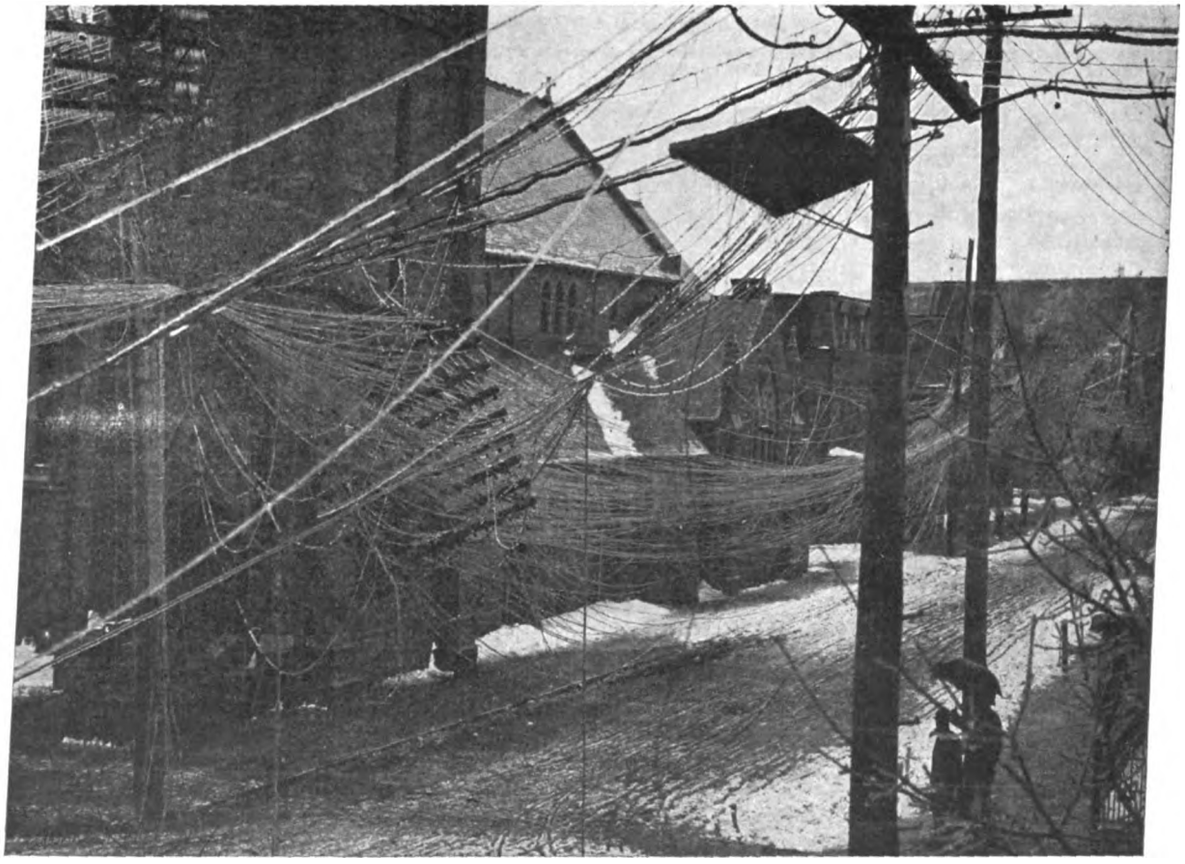
WE MAKE CABLE

No. 2—MORAL DAMAGE

Aside from the physical loss incident to a wreckage of open aerial lines, there is the moral effect it has upon the community at large. When a man subscribes for continuous telephone service, he expects to get it, and adjusts his business accordingly. The telephone becomes a part of his individual machine and is of even more importance than the mail. On the other hand the company contracts to deliver such service to the best of its ability. If it fails for any cause, no matter what, it at once becomes the butt of the most unreasonable criticism.



One bad apple will turn a whole barrel; similarly one unreasonable patron may be the cause of inestimable loss to the company at a time such as this. Accidents will happen but the most logical argument is to take such precautionary measures that will leave nothing undone that could prevent them. The use of cable is the most justifiable precautionary measure you could employ. If correctly installed, you have done everything in your power to prevent breakdowns or interruptions to the service.

Write for the Cable Book—It's Free.

No. 3—Mental Damage Will Run Next Week

STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N.Y. CHICAGO, ILL.

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NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

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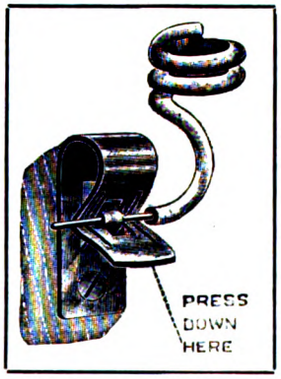
You are cordially invited to visit our booth, No. 20, Section C, at the Electrical Show, Chicago Coliseum, January 15-27.

AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

SOME ONE

has said that the difference between a wet battery and a dry battery lies in the fact that a wet battery gets dry and a dry battery stays wet. Staying wet is the thing that has made the dry cell popular. Staying wet means a lower cost of keep per year per cell, and that is just what the



Fahnestock

Spring Binding Post

means. It means that the cells are connected up more quickly and easily. It means that when they are connected up they stay so and you are never bothered with loose connections, corroded contacts or broken wires.

It means that if your dry cell has a certain capacity you are going to get all of that capacity out of it and not lose any overcoming the resistance of a loose or dirty contact; and it doesn't cost you a cent to have this connector on your cells. Ask for it on your next order, no matter what make of battery you are using.

FAHNESTOCK ELECTRIC CO.,

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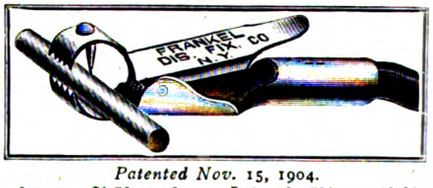
SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.

Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
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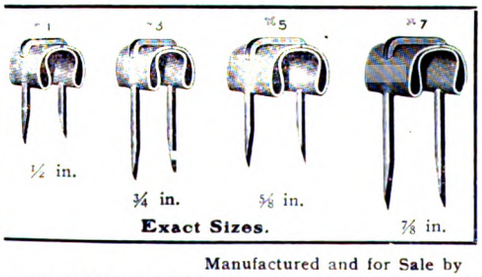
GET out of that rut of skinning the wires—IT'S EXPENSIVE.
THIS device will save both valuable time and material—THAT'S PROFIT.
The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

FROM YOUR SUPPLY HOUSE, OR

FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

Blake Insulated Staples



The double thickness of insulation, under the head of the staple, gives a large surface of contact with the wire, to stand mechanical strain.

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Western Electric Company.

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1906.

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VOLUME XIII SATURDAY, JANUARY 27, 1906 NUMBER 4

An Emergency Telephone

By John Grant.

IN the Park Row Building, in New York City, is an elevator shaft containing ten cars. These cars carry passengers from the street level as high as the twenty-fifth floor, and the number of trips they make and the number of persons they carry each day runs to a very high figure. Not only is the number of persons large, but from a business standpoint the importance of the individuals who find occasion to use these elevators is recognized as the highest. In this building are located the offices of men and of corporations which represent some of the largest interests in the country. In a city where there is such a daily concentration of immense activity by the greater number within the few hours spent in the business district, which is comparatively remote from residences, it is of the greatest importance that the amount of time lost in moving from place to place should be reduced to a minimum. The aggregate value of the time spent by all the passengers in the elevators of this building alone would reach several hundred dollars each day if computed on the basis of their earning capacity. Such being the case it is the obvious duty of the management of such a building to provide to the fullest extent for the highest efficiency in the operation of its elevator cars. In such provisions lie not only the ordinary arrangements for securing the safety of passengers, but those for the prevention of any unnecessary delay, even of the shortest duration.

Telephone in Elevator Car to Be Used for Communication with the Engine Room in Cases of Emergency.

The managers of the building, in addition to providing special equipment of the highest grade to insure the safety of its passengers, have realized the advantage of providing a means for direct communication between the operator of each car and the attendant at the source of power. To attain this end each elevator has been equipped with a telephone. Each instrument is connected to a line led through the heavily insulated flexible cable which carries the ordinary signal and lighting wires to a distributing point, from which it runs to the engine room. At this point connection is made with an instrument in a location readily accessible to the engineer. The elevator system is entirely distinct from the private system for general use in the building, and in the details of construction the greatest care to prevent possible failure of service at a critical moment has been exercised. The instruments are of a compact type, employing a transmitter set within the face of the box enclosing the hook switch and induction coil, with only the mouth-piece protruding, and the receiver is of the ordinary bipolar type. The use of a battery call system, with vibrating bells contributes to the compactness of the set while at the same time it enables the car operator to call without the labor of turning a crank. The instrument is conveniently located on the wall of the car near the front, at the left hand side of the operator when he is standing at the usual position in front of the controller.

Occasions for the use of these instruments have been of extremely rare occurrence, although they have been installed ever since the elevators have been in operation. On such occasions as have brought about a temporary brief interruption of service, however, their value has been greatly appreciated, not only by the operators, but by the passengers. They have been of assistance to the engineer in the proper manipulation of his machinery, and have enabled passengers and operators to ascertain the extent of the difficulty, and so have been able to materially reduce the annoyance or apprehension that might otherwise exist owing to an interruption of service in such an extremely high shaft.

This instance of the extension of the telephone service to one

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of the minor fields of passenger transportation is another illustration of the value attached to the maintenance of constant means of communication between the separate parts of such a system. The conception of the telephone as an instrument limited to services in fixed stations is fast disappearing, and it is likely that the time is near at hand when a man may be able to keep in constant communication with his home wherever he may be. The fact that he is riding rapidly across the country or moving upward will prove no barrier to the telephone, as the skill of our engineers is rapidly overcoming such obstacles.

Care and Maintenance of a Pneumatic Ticket Distributing System

By E. A. Hawkins.

A TOLL ticket containing the details of a call, as ascertained from the calling subscriber by the recording operator, denotes an unfulfilled contract. The ability of the operating company to fulfill that contract is dependent upon the facts stated on the toll ticket. It therefore follows that the security of that ticket must be closely guarded. From a description of the operation of a pneumatic ticket distributing system the point will arise that it seems like taking a great risk to entrust a toll ticket to such a system. Upon further consideration some alarm might exist as to the consequences in case the vacuum should be destroyed at a busy hour of the day. In such a case the data for several hundred connections would be lost temporarily in the various tubes of the system. Care and maintenance of such a system is therefore a subject of the very highest importance.

In all complicated systems the troubles that may be encountered are numerous. The more important ones are as follows:

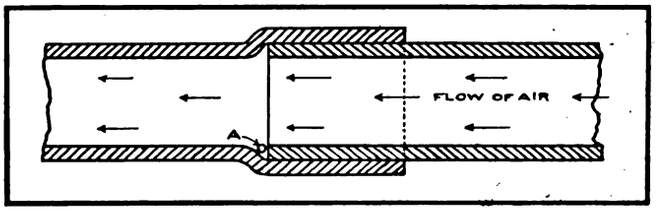

Fig. 1. Joint in tubes, showing method of avoiding interruption of passage of tickets.

1. *Tube system not in perfect condition before using.*

A very small obstruction in the interior of a ticket tube may interfere with the passage of tickets. The ticket tubes are made up in sections, about fourteen feet long and are fastened together by means of an expanded joint as shown in Fig. 1. In order to make the joints airtight they are soldered together. Great care must be exercised in the soldering. A small globule, as shown at A, might be readily forced in by the pressure of the gas flame used for this purpose.

All joints should be so made that the flow of air through them will be in the direction indicated by the arrow in Fig 1. Otherwise the ticket will become lodged against the edge of the inner tube. Sharp twists and bends must not be near together in the same runs. The ticket can then gain momentum on the straight portions of the runs before encountering such obstructions. After the system is fully installed the whole tube system should be "blown out" by reversing the direction of rotation of the exhaust, thus making it a positive pressure blower. This can be done either by crossing the belt or by reversing the connections of the motor which drives the exhauster. By this means all dust, dirt and other matter that may have collected in the tubes, will be removed through the open ends of the tubes. The entire system should be given a rigid test before any attempt is made to put it in service.

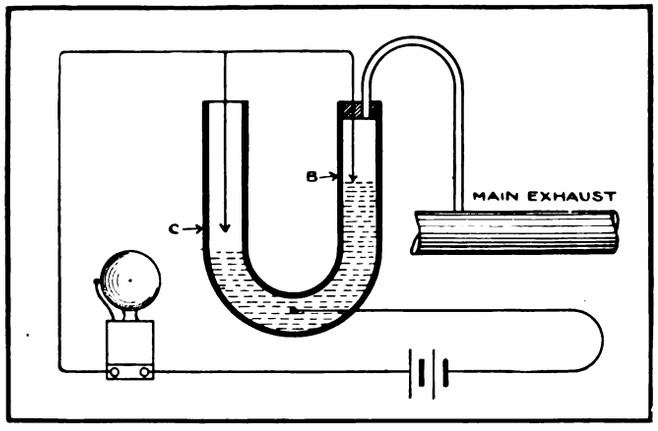

Fig. 2. Connections of alarm bell circuit to mercury vacuum gauge for calling wire chief's attention to change in pressure.

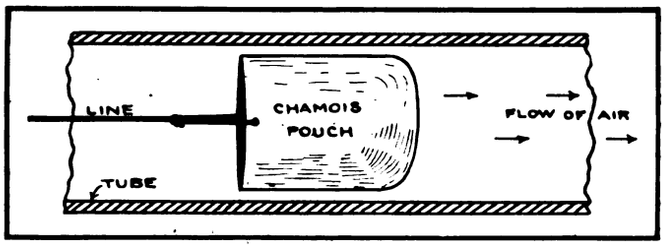

Fig. 3. Carrier for taking line through tube.

The more use a tube receives, the more perfect does its interior surface tube become. The continued rubbing of the tickets gives the inner walls of the tubes an exceedingly high polish. An uninterrupted stream of tickets run through the system for a few hours before the final test will contribute to its success.

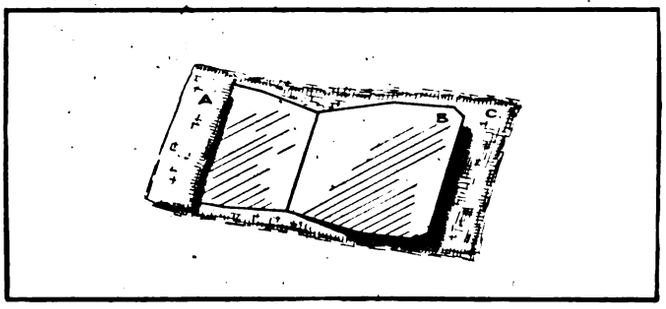

Fig. 4. Cleaner to be passed frequently through tube; A, flannel cover, folded; B, fibre support; C, end of flannel.

2. *Failure of power at the exhauster.*

If the system be of such size that in case of failure of the exhauster to keep up the required vacuum, it would be impossible to distribute the tickets by messengers during the time required for repairs, then there must be a duplicate set of exhausters provided. The exhauster is generally belt-driven by an electric motor. In the case of two exhausters and motor units the motors must be run from two entirely independent sources of power.

The motor capacity, the sizes of motor fuses and the overload feature of the motor speed regulator should be so ample that a sudden overload cannot put the system out of commission. The power board containing the motor controlling apparatus, and also the air gates at the individual exhausts, must be readily accessible. In case of accident to one unit it is thus possible for the attendant to quickly start the reserve unit.

3. *Variable vacuum in system.*

After a system has once been adjusted to a certain vacuum it is absolutely necesssary that the vacuum should not vary.

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Otherwise the speed of tickets will be too high or too low for safe travel. Any desired vacuum can be obtained in the system by means of the variable resistance in the motor starter, assuming that a direct current source of power is used.

It is often necesssary to cut off the flow of air through a number of unused tubes after the busy hours have passed. This cannot be done by merely closing the cut-off valve at the various receiving points. By so doing the exhauster, if still running at a fixed speed, abstracts the same amount of air through the system. This exhaustion through a smaller number of tubes will produce a higher vacuum. In order to cut off a number of tubes it is necessary to make a change in the speed of the motor.

There should be two vacuum gauges for all systems; one, to be located at the power board for the use of the attendant, and the other in the toll operating room. The mercury column type of gauge can always be relied upon for accuracy and is therefore desirable for this purpose.

In case the vacuum is higher or lower than required by the safe limits of the system, an alarm must be sounded both in the operating and blower rooms. This will indicate to the operators that no more tickets are to be sent until a normal vacuum has been restored. This is indicated by the inactivity of the alarm bell. The attendant, on hearing the alarm, is required to instantly start up the reserve unit. Readjusting the speed of the unit that was in use may be all that is necesssary. An alarm of this nature can be made up from a "U" tube, as shown in Fig. 2. The positions of the electrodes B and C are adjustable. When contact between the mercury and electrode B is made, an excessively high vacuum is present. In a similar manner an excessively low vacuum would be indicated by a contact at C.

4. *Humidity.*

The amount of moisture in the atmosphere of an operating room plays an important part in the successful operation of a pneumatic distributing system. The moisture in the air passing through the tubes has a tendency to condense on the inner walls of the tubes and tends to interfere with the passage of the tickets. Although tickets can be passsed through tubes containing a considerable amount of moisture, yet the chance of trouble under such conditions is increased. It is therefore necessary that dry air be supplied to the operating room. In case this is inconvenient, care should be taken to see that no windows are open in the neighborhood of the recording or distributing tables.

5. *Dirt in Tubes.*

For the successful operation of the system a clean operating room is absolutely essential, since the air of the room is being continually drawn off through the ticket tubes and out through the exhaust. Thus any dust that may be contained in the air will be deposited in part on the inner walls of the tubes. Since it is impossible to keep the air perfectly clean, the interior of the tubes will become coated with dust. As the cleaning operation is laborious, it is desirable to keep the ends of the unused tubes plugged up. If a tube remains out of commission for some time, a solid plug must be inserted in its sending end. The cut-off valve at the receiving end must be also closed, thus shutting up the tube completely. These solid plugs are made of metal or of soft rubber. The latter are in favor, since they need not be fitted for any particular tube, as in the case of the metal plugs.

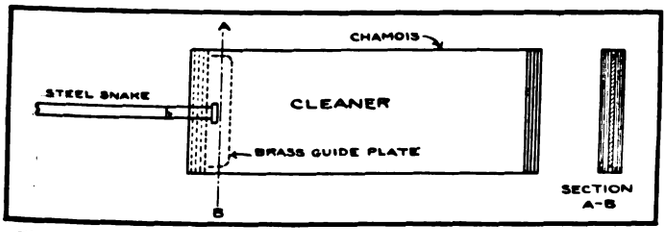

Fig. 5. Form of cleaner used for removing dust from tube at night.

It would be impossible to cut off the flow of air through a comparatively large number of tubes, as stated, without raising the vacuum on the system, unless the speed of the motor was varied proportionately. Therefor, when cutting off the flow of air for a short time through one or more of the tubes, preliminary to a general reduction in the total number of working tubes, because of a decrease in the calling rate, a screen plug is utilized. By this means the dirt is kept from entering the tubes and the vacuum is not varied.

There are two general methods of keeping the tubes free from dirt. One is to clean the tubes at one or two fixed periods of the day when the operation would least interfere with the working of the system. The second method is practically to keep the tubes from becoming dirty. This is accomplished by sending a cleaner through the tube every half hour or so. The form of cleaner used for this purpose is shown in Fig. 4.

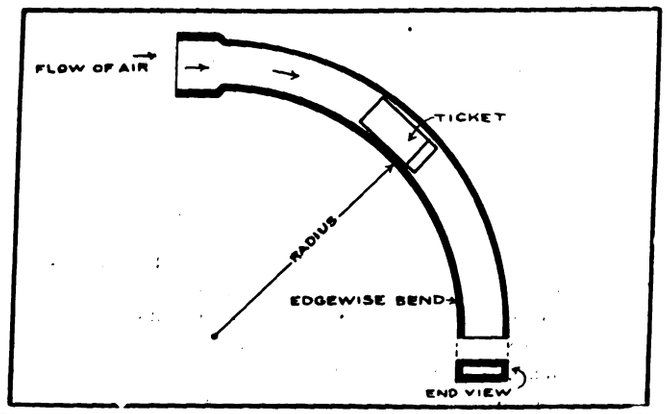

Fig. 6. Section of bend, illustrating proportions between width of tube and radius of curvature.

This cleaner consists of a piece of soft flannel cloth wrapped about a stiff fibre card, bent into the form shown in the illustration. It is propelled through the tube by the force of the air in the same manner as a ticket. When such a cleaner has become dirty after several passages, the cloth is turned.

For the method used in cleaning a tube less frequently there must be a man at both the sending and receiving ends. A carrier, consisting of a chamois pouch, as shown in Fig. 3, attached to the end of the strong line wound on a reel, is inserted in the sending end of the tube. This carrier is drawn through by the flow of air like a ticket. Upon the arrival of the carrier at the receiving valve, a heavier line is attached to the first line and pulled back through the tube by the man at the sending end. In case the tube run is long and has many bends and twists, a steel snake is pulled through in a similar manner. This heavy line or steel snake, as the case may be, is attached to the cleaner, a common form of which is shown in Fig. 5.

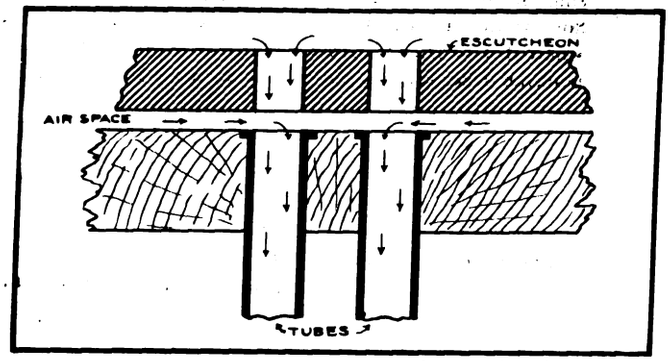

Fig. 7. Opening of tube, showing construction for reducing air pressure on ticket at moment of insertion.

This form of cleaner is made up of several layers of chamois. The cross sectional dimensions of this cleaner should be such as to just permit of its being squeezed into the end of the tube. The cut-off valve must be closed while the cleaner is being pulled through. The passage of the cleaner through the tube must be in the same direction as that of the tickets; namely, from sending to receiving ends.

In the case of a very dirty tube, which may have been out of commission for some time, a mixture of clean fine sand and talcum powder may be blown through the tube to cut the dirt,

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but the after effects of this is such that its use is not recommended.

The number of times that such a cleaner must be drawn through is dependent upon the condition of the tube. Under normal conditions, one passage of a cleaner of this type is sufficient. The frequency with which the whole system of tubes is cleaned is entirely dependent upon the local conditions present at that exchange. If the tubes are cleaned in this manner once a day trouble on this account would be entirely eliminated.

6. *Accessibility of all tubes.*

It is essential that all tube runs be accessible throughout their entire length. If the tubes are run under false floors trap doors must be installed over all of them. If they are run in tube boxes, such boxes must be made up entirely of removable panels. Equal care must be exercised in laying out of tube run, as in the case of a cable run, so that the installation of additional tubes will not be prevented. The filling up or growth of tubes at the twists and bends should be such that it will be possible to remove any section of a tube run without it being necessary to remove the corresponding sections of adjoining tube runs.

7. *The size, style and weight of tickets.*

The operation of the best of systems would be unsuccessful if the ticket was not properly designed for it. The width of the ticket must bear a relation to the corresponding inside dimensions of the tube and also to the minimum radius of the edgewise bends as indicated in Fig. 6, otherwise the ticket will tend to stop at such bends. The flap of the ticket must be of sufficient length, so that it cannot be opened out by the force of the air. If a heavier ticket is used than that for which the system is designed, trouble will be experienced in the vertical runs and at the twists.

8. *Handling of tickets.*

The correct handling of tickets by the operators at the sending ends of the tubes is of much importance. There will be a strong flow of air into the tubes at the distributing and recording tables where the tubes are open ended. It is therefore necessary to hold the ticket between the fingers in such a manner that it will be impossible for the flap to open out the instant before it is inserted in the mouth of the tube. In order to eliminate the personal element in correctly placing the ticket in the tube, the flow of air over its mouth is reduced by means of a slight opening or air space between the actual ends of the tubes and the escutcheon over the tubes, as indicated in Fig. 7. The arrows represent the direction of the flow of air into the tubes. Considerable care must be exercised by the operators in inserting the tickets into the sending valves. When the valve is opened the flow of air at its mouth will likewise tend to open out the flap of the ticket. In order to get the full benefit of the pressure on the flap at the sending valves, the tickets must be inserted with their flaps projecting upwards.

9. *Adjustment of pressure on each tube.*

As previously pointed out, the pressure at the sending end of each tube can be regulated by means of the cut-off valves. After they have once been properly adjusted, and it is found necessary to either entirely close or open the same to clear trouble, care should be taken to see that they are readjusted to their proper position, as generally indicated by a set screw.

10. *Leaks in tubes and valves.*

The entire system must be free from leaks. A small leak in a tube will so reduce its vacuum that the pressure on the ticket will not be sufficient to pass it by the point of greatest resistance. If the leak is a bad one, there will not be a sufficient flow of air at the sending end of the tube to start the ticket. A leak in the seats of the sending valves on the common return tubes will cause similar trouble.

11. *Foreign material in tubes.*

It has been found by experience that operators will carelessly allow articles, such as pencils, pins, small pieces of paper, etc., to pass into the tubes. Since they materially affect the operation of the system it is necessary to maintain strict discipline in this respect.

(To be continued.)

The Problem in Resistance

The method of solving a problem in resistance by Prof. G. W. Wilder, of the Armour Institute of Technology, has brought out from our subscribers the following alternative methods of obtaining the desired results, which we take pleasure in publishing herewith.

SOLUTION BY A. F. POOLE.

IN looking over the article on "A Problem in Resistance," in the issue of THE AMERICAN TELEPHONE JOURNAL for Dec. 16, it seemed to the writer that the value of the required current could be obtained by a more direct method than either of those given by the writer of the paper. The method of approximation given in the second part of the article does not seem to him to be applicable to the particular case to which it has been applied. It is longer, if anything, than the first solution and misses the correct value by nearly 100 per cent. One is at a loss to see why this so-called method of approximation was given at all. It can apply only in the special case of the resistance r_5 being very large in comparison with the other resistances in the circuit. In the problem r_5 is only about 12% of the next higher resistance and naturally the method gave a result which was wide of the mark.

The problem is, given the various resistances R_1 R_2 R_3 R_4 R_5 connected in circuit as shown in Fig. 1 and the voltage between A and B, required the value of the current flowing in the path R_5 between C and D.

Let R_1, R_2, R_3, R_4 and R_5 be the resistance of the various branches of the mesh and C_1, C_2, C_3, C_4 and C_5 be the currents flowing in the corresponding branches. That is C_1 is the current flowing through R_1, C_2 that through R_2 and so on. Also let $V =$ the voltage between A and B.

At the point C the current flowing in is equal to the sum of the currents flowing out, so we may write

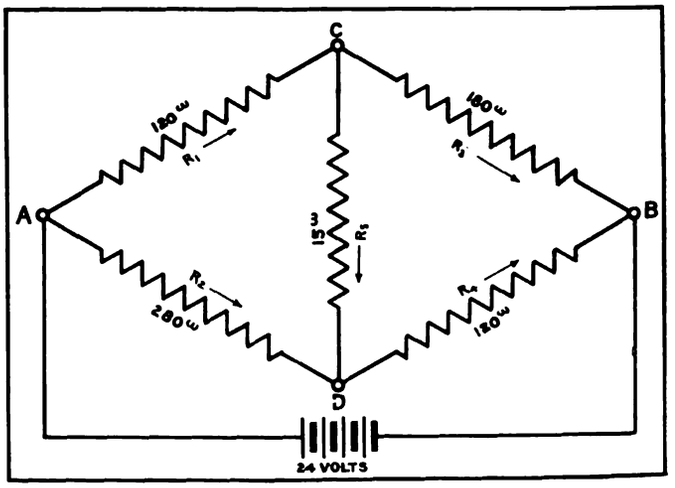

Fig. 1. Connections of battery and resistances.

$$C_1 = C_5 + C_3 \quad (1)$$

and similarly at the point D,

$$C_2 = C_4 - C_5 \quad (2)$$

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Since the voltage equals the current strength multiplied by the resistance through which it flows we may write

$$C_1 R_1 + C_3 R_3 = V \quad (3)$$

$$\text{and } C_2 R_2 + C_4 R_4 = V \quad (4)$$

In the loop C D B the sum of the various electromotive forces must be zero, so we may write

$$C_3 R_3 + C_4 R_4 - C_5 R_5 = 0 \quad (5)$$

Substituting the value of C_1 given in (1) in (3) gives

$$C_3 = \frac{V - R_1 C_5}{R_1 + R_3} \quad (6)$$

Similar comparison of (2) and (4) gives

$$C_4 = \frac{V + R_2 C_5}{R_2 + R_4} \quad (7)$$

Substituting the values of C_3 and C_4, given in (6) and (7), in (5) gives

$$\frac{R_4 (V + R_2 C_5) - R_3 (V - R_1 C_5)}{R_2 + R_4} + C_5 R_5 = 0 \quad (8)$$

Solving (8) for C_5 gives

$$C_5 = \frac{V (R_2 R_3 - R_1 R_4)}{(R_1 + R_3) R_2 R_4 + (R_2 + R_4) R_1 R_3 + (R_1 + R_3)(R_2 + R_4) R_5} \quad (9)$$

In which by proper substitution C_5 may be found.

For this particular case it is easier to substitute the values in equation (8), $R_1 = 120$, $R_2 = 280$, $R_3 = 180$, $R_4 = 120$, $R_5 = 15$, $V = 24$. Substitution of these values gives

$$\frac{120 \times (24 + 280 C_5)}{400} - \frac{180 (24 - 120 C_5)}{300} + 15C = 0.$$

This reduces to

$$570 C_5 - 24 = 0$$

from which $C_5 = .0421$ amp.

This is the same result obtained by the first method of the paper under discussion with half the numerical labor.

Having this value of C_5 it is only necessary to substitute its value in equations (6) and (7) and add the results to obtain the total current flowing from B.

$$C_3 = \frac{24 - 120 \times .0421}{300} = .06316$$

$$C_4 = \frac{24 + 280 \times .0421}{400} = .08947$$

$C_3 + C_4$ = total current at A or B = .01526 Amp.

In order to check the computed value of C_5 a circuit containing

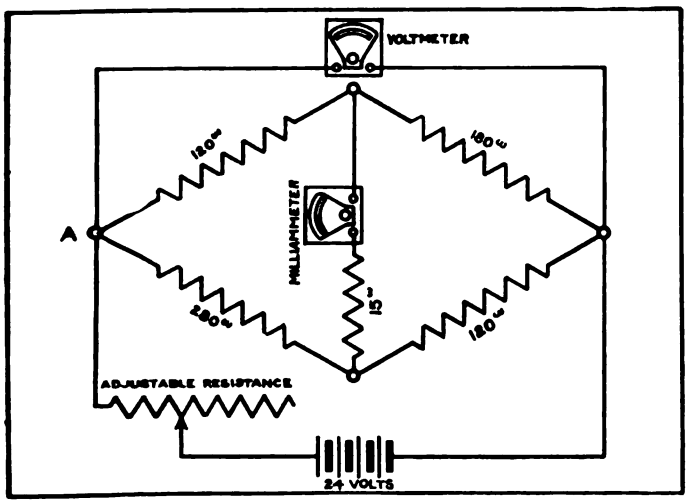

Fig. 2. Connections of voltmeter and milliameter for checking figures.

the various resistances and a voltmeter and milliammeter was arranged as in Fig. 2.

The ammeter used is one in which 150 milliamperes causes the needle to be deflected across the entire scale and it can be read to 0.0001 amp.

When the resistance was adjusted so that the voltmeter needle read 24 volts, the ammeter read 0.0425. This agrees with the computed value well within the limits of errors in the resistances composing the mesh.

Equations (8) and (9) are very useful ones; for example suppose it is required to find the current flowing in C_5, when it is connected to B, Fig. 3.

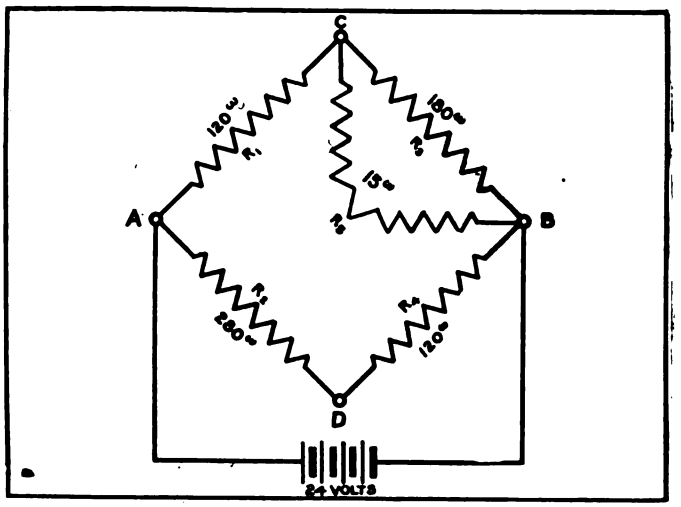

Fig. 3. Arrangement of connections for solution by special equation.

In this case R_4, or the resistance which corresponds to R_4 in Fig. 1, is zero. Take equation (9):

$$C_5 = \frac{V (R_2 R_3 - R_1 R_4)}{(R_1 + R_3) R_2 R_4 + (R_2 + R_4) R_1 R_3 + (R_1 + R_3)(R_2 + R_4) R_5}$$

make $R_4 = 0$.

Then all terms containing R_4 as a factor equal zero and the equation reduces to

$$C_5 = \frac{V R_3}{R_1 R_5 + R_1 + R_3}$$

an expression independent of R_2, as it should be.

From this equation (9) can also be obtained the proof of the principle of the Wheatstone bridge, for then $C_5 = 0$.

If $C_5 = 0$, the numerator of the fraction on the right side of equation (9) must equal zero, hence,

$$V (R_2 R_3 - R_1 R_4) = 0$$

$$\text{or, } R_1 R_4 = R_2 R_3$$

$$R_1 : R_2 :: R_3 : R_4$$

the familiar equation of the bridge.

In conclusion it seems as if the reported observation of "those who actually measured the current" that the value of the current in the branch C_5 was only 0.015 amperes is a case of either an error in experimenting or mistaken reporting. There is no need to account for the discrepancy between the observed and calculated values. There should be none if the observation and calculation are correctly made.

SOLUTION BY S. DUVAL, OF THE ECOLE NORMALE, JACQUES-CARTIER, MONTREAL.

SOME students might find it easier to work the problem of the unbalanced Wheatstone bridge in the following way: We may suppose that the branches AC and DB have been split so as to afford three independent paths for the current going from A to B. If we denote by c and d the voltage of points C and D, the voltage of B being 0, and that of A being 24 volts, we will have for the current in the different branches of Fig. 4.

$$\text{From C to B} \quad I_1 = \frac{c}{180}$$

$$\text{From A to D} \quad I_2 = \frac{24 - d}{280}$$

The current in the 15 ohm resistance connecting points C and

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D will be that due to the difference in potential between these points, or

$$\text{From C to D} \quad I_3 = \frac{c-d}{15}$$

The total current from A to C will be $\frac{24-c}{120}$ but since this current is the sum of I_1 and I_3 we may write

$$\frac{24-C}{120} = \frac{C}{180} + \frac{c-d}{15}$$

From that equation we find $d = \frac{29}{24} C - 3$

The total current going from D to B is:

$$\frac{d}{120} = \frac{24-d}{280} + \frac{c-d}{15}$$

This equation gives $d = \frac{28}{33} C + \frac{12}{11}$

We now have two separate equations representing the value of d, and these may be equated to effect a determination of the value of the quantity C. On so doing it is found that

$$c = \frac{216}{19} \text{ volts.}$$

and solving for the values of other quantities we have:

$$d = \frac{204}{19} \text{ volts.}$$

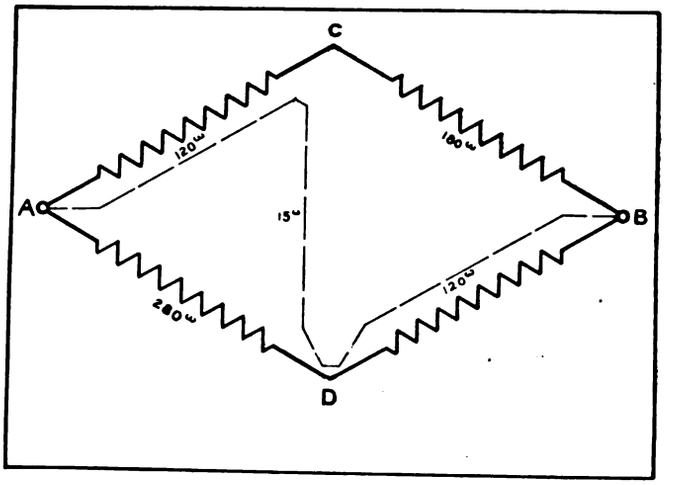


Fig. 4.

$$c - d = \frac{12}{19} \text{ volts.}$$

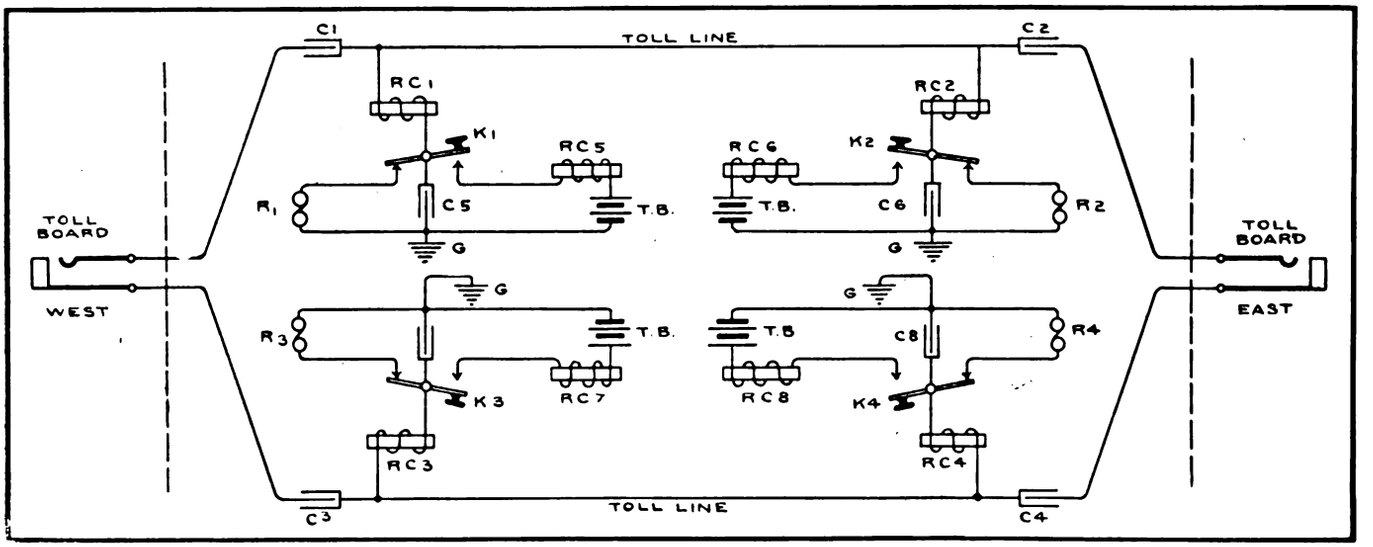
$$I_3 = \frac{4}{95} \text{ amperes} = 0.0421$$

Simultaneous Telephony and Telegraphy

By Louis Muhlheizler.

A CIRCUIT which ingeniously provides for the use of telegraph instruments upon a telephone line is shown in the accompanying illustration. In the figure C 1, C 2, C 3, C 4 are condensers, inserted one in each line wire, between the switchboard and the points where the telegraph instruments are connected. The ratardation coils R C 1, R C 2, R C 3, R C 4, in the telegraph line circuit are about 4½ inches long, with a core of battery, common to each of the four instruments, is used. The condensers in the battery circuit are shown at C 5, C 6, C 7, C 8. The effect of this combination of apparatus is to add to the capacity of the line for telephonic purposes two complete grounded telegraph lines, each provided with an instrument at each end for the sending of messages in either direction.

The retarding effect due to the electromagnetic inertia of the



Circuit Connections of Apparatus to Provide for the Simultaneous Use of a Metallic Circuit to Transmit Three Messages—One by Telephone and Two by Telegraph.

No. 24 soft iron wires ½ inch in diameter. Each coil is wound with No. 30 B. & S. wire, silk and cotton covered, to a resistance of 250 ohms. The retardation coils R C 5, R C 6, R C 7, R C 8, in the battery circuits of the respective telegraph sets are similarly constructed, except that their resistances are only 150 ohms each. The telegraph keys K 1, K 2, K 3, K 4 are of the double contact type, one side being opened at the time the key is depressed to close the other. Morse relays, shown at R 1, R 2, R 3, R 4, are each wound to 150 ohms resistance. A special 150 volt telegraph coils prevents the currents from either gaining or losing their strength suddenly, a gradual rise and fall in strength taking place instead. The condenser, which is charged at each closing of the key, and discharged to line at each opening, aids in checking the abruptness of the telegraph signals. Although each side of the toll line at each end is connected to ground through the telegraph circuit, the impedance of this apparatus is so high that no appreciable loss in transmission is noticeable. The ringing is also satisfactory, although in this connection it should be noted

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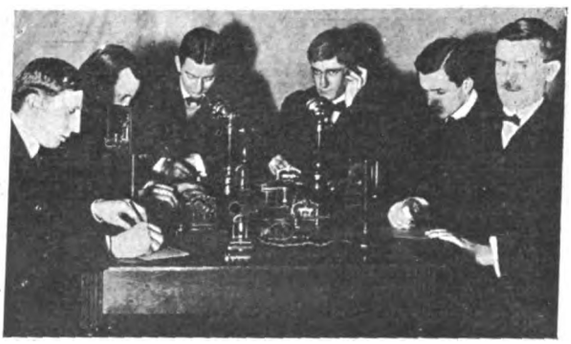
that an ungrounded generator should be used. If this were not done ringing on the telephone line would cause the telegraph relays to flutter, temporarily interrupting any message being transmitted through these instruments. It is to be noted that a perfectly balanced line is secured, thus doing away with any possibility of the introduction of noise upon the telephone line.

Although this circuit must be very carefully maintained to prevent the occurrence of tree grounds or other leakage due to low insulation, it is believed to be as little affected by these troubles as a repeating coil simplex circuit. In wet weather the only difficulty noted is the necessity of occasionally adjusting a relay.

Although this circuit is not adapted to high speed telegraphic transmission, on account of the retarding effect of the various coils in the circuit, it possesses many features which make it valuable for use on toll lines of a length reaching up to 100 miles. It has been found to produce practically no interference with the use of the line for telephonic transmission, while it operates to produce a material increase in revenue.



Operators Using Telegraph and Telephone Apparatus on a Single Circuit of the Pittsburgh and Alleghany Telephone Company.

HOW WOULD YOU LIKE A TELEPHONE FREE? A NEW BELL GIFT WITH A STRING ATTACHED.

SPEAKING of philanthropy, the generosity of Carnegie with his library gifts and of Rockefeller with his donations to the Chicago University pale into insignificance when compared with the kindness of the Cumberland (Bell) Company in Louisville, Ky. All who live in less favored communities should study the facts in the case, for perchance some morning they may arise to find the hand of the giver has written his message of love for the people upon the front page of the local news sheet.

In Louisville is a newspaper, the *Courier-Journal,* which is ever on the alert to serve its patrons. Midnight oil is consumed by the barrel so that schemes for the good of the people may be hatched and carefully reared before being subjected to the piercing beams of the midday sun. There being no longer any war, either political or military, to assist the population in the use of their eyes and tongues, a brilliant idea crossed the minds of the powers that be. "Eureka," they said, "we have it! All that is needed to make our lot upon this earth one long dream of bliss is a Bell telephone in every home."

Now the Cumberland people had thought the same, but, alas, the gentle art of separating the public from its trust-like grasp upon the needed coin was not well understood by its simple agents. And besides there was a hustling competitor in the field who seemed to get more than his share of this same coin. Such a condition as this was intolerable, so the *Courier-Journal* people and the Cumberland Company got together and brooded over the matter. At last some one hit upon a brilliant idea. A fresh barrel of midnight oil was tapped and 'neath the fitful gleam of the lamps of genius a plan was perfected which in grandeur of design outdid anything ever before conceived in the Blue Grass State. Next day in bold array the magic words, "Have You a Telephone?" headed an advertisement in the *Courier-Journal* occupying a space about nine inches by six and a half, placed in a prominent position. The readers gazed in amazement at the question before they quite understood its import. Then continuing to read they were brought face to face with a second poser: "If not, how would you like one practically free?" Just think, no qualification as to social rank was necessary; the shoeblack or the washerwoman could stand on equal footing with the millionaire. Would they like one? Well, just guess! Some skeptical people were for going right up and getting two or three before the offer was withdrawn, but the more staid had a restraining influence upon the multitude until further particulars were learned. The next paragraph read as follows: "The *Courier-Journal* has closed a contract with a well-known and responsible Promotion Company, under the terms of which we can place in almost any residence in Louisville a Coin Receiving Bell Telephone at practically no expense for one year." Right away the feminine contingent of this paper's noble army of readers was subjected to severe pains near the region of the heart. "Almost any residence," so the advertisement read. Suppose it meant that any of their domiciles were without the magic area, that Mrs. Jones might be lucky and not Mrs. Smith. "Wouldn't it be just too awful for anything?" one fair dame was heard to say. The part that seemed to stick most of the natives was the "Coin Receiving" clause. Some thought it might be an automatic bank, while one of the rural readers declared it was a scheme whereby a wife could secrete any loose change she found in her husband's clothes. One or two there were who had misgivings as to the true meaning of the phrase, but they were laughed at, for did not the ad say in big type "practically free" in one place and "practically no expense" at another? No, that "coin receiving" might refer to a place to put the money that would otherwise have to be spent for telephoning, so that when it was opened at the end of the year the public could be agreeably surpirised with the money it had been saved by this wonderfully generous gift of the *Courier-Journal* and the Cumberland Bell.

To secure further particulars the reader was asked to fill in a blank and send it to the City Circulation Department. Oh, the wily Cumberland! So attractive a bait, such an irresistible lure it has devised. What advertisement of magic substance to be smeared upon the ugly angle worm to bring to the hook of the country youth untold thousands of fish can equal this! PRACTICALLY NO EXPENSE—for installation. Since when has a

(*Continued on page* 65.)

SUPPLEMENT TO OFFICIAL BULLETIN NUMBER SEVEN OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

STATE REPRESENTATION—NEXT CONVENTION:

We wish to call the attention of the various State Associations to the necessity of electing delegates to the National-Interstate Convention to be held some time in June.

We also urge Independent interests in states at present having no Association, to organize as soon as possible, so that they may affiliate with the National-Interstate Association, and be represented at the convention. States organized but not yet members of the Association should do their full share in forwarding the Independent telephone movement by becoming members at once.

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THE EDITOR'S PAGE

A MINOR WASTE.

IT is generally argued that in any business the needless duplication of labor is one of the principal sources of waste. The faults of management which operate to reduce the returns from a given investment may be broadly divided into two classes. Of these one may be said to include only the large errors, mistakes in judgment which are of infrequent occurrence, but which commit a concern to an unsuccessful policy, or involve it in operations which produce inadequate returns for the amount of money and effort expended. The other variety includes many things which in themselves may be considered trifling, but which are liable to be frequently repeated. In fact, this feature of repetition seems to be so characteristic of the faults of this minor class that all persons under whose observation they come grow so accustomed to their appearance that if not completely overlooked they are accepted as proper parts of the general system. In this way, as each causes a slight loss, the waste from every individual item is added to the mass piled up from those which have gone before, until at the end of the year a proper accounting would show a comparatively enormous sum. At this time, however, the management finds itself in the same position as the man who figures up how much money he would have saved if he had let alone his cigars, and nothing can be done. In an industry where one of the principal sources of expenditure is the cost of labor, the avoidance of all loss caused by the doing of unnecessary work is one of the most important conditions of success.

In telephone work a considerable portion of the labor expenditure is that for the keeping up of the plant, and of this, again, a very appreciable share is expended in the clearing of trouble.

Every telephone man familiar with the details of the work of the man who clears switchboard circuit troubles, or those which impair the working of the subscriber's line, can recall innumerable instances where a great deal of testing at distributing points has been necessary before a determination could be made of the wires composing the circuit in which the fault was to be found. It is an exceptionally well organized company, and one which may well compliment itself upon the efficiency of its equipment force, which has not many subscribers in thickly settled districts or large buildings who are familiar with the often repeated discussions of construction methods by maintenance men. In nearly every instance the cause is the same old grievance and the complaint takes the well-known form, "He just pulled in the wires any old way and you can't tell which one you want." And then the maintenance man tests them out, finds the one he wants and remembers its location from that time. If, however, he looks for a trouble on another line carried to that same group of terminals, or a new man is assigned to cover the district, the same process of searching and testing must be gone through, while the man loses his patience, the company its money, and the subscriber his service. This annoyance and delay would never occur if all circuits were pulled into terminals in the order of their numbers, and the numbers plainly marked to indicate this to be the case.

The points where a loss of valuable time occurs in a manner similar to this are numerous in many plants. Such a lack of order while generally avoided in as far as the subscribers' lines are concerned in the central office is known to occur with astonishing frequency at all minor terminal centers between the office and the subscribers' station. It is the more remarkable that this should be true since all lines and all cable conductors are assigned definite numbers and the question of the manner of designating the terminals of such wires is not open to doubt. In addition to the regular lines in every central office there are numerous circuits of a special nature where a complete and accurate designation scheme would lead to valuable results. The proper marking of all circuits is one of the most substantial aids to proper maintenance, and effects a saving in time which gives it a place amongst the important means of securing minor economies.

THE CONTROLLING INFLUENCE.

THE realization and acknowledgment by the public of the extent to which the telephone has made itself indispensable in the conducting of modern affairs are in recent times becoming commensurate with the real importance of the industry. Enterprising contract agents, in their efforts to keep equipment men moving at a lively pace by the addition of new business, have set forth long lists of the advantages of this method of communication for the accomplishment of the greatest variety of purposes. This catalogue seems to cover a range embracing nearly every phase of activity in the home and business affairs of every individual, from the ordering of the day's provisions in the morning through the details of the day's work to the arrangements for the pleasures of the evening. All extraordinary events also furnish instances of the superior utility of this marvelous means of communication. It lends itself with equal facility to the hasty summons of the physician, the transmission of the time-honored fanciful protest against the outrageous dimensions of his bill, and to the saving from the wicked grasp of the night-stalking burglar of the wherewithal for its payment. The contract agent has steadily urged his claims, and so skillfully have they been set forth, and so thoroughly have they been proved and borne out by common experience that the public has accepted them, and looks upon things from the same viewpoint.

The telephone is now largely in use not only as an agent for the accomplishment of numerous acts bearing on unrelated details, but as a means of unifying and controlling many isolated divisions of business enterprise. In the work of transportation it is used alike to control the movements of the great ocean steamship, the trolley car, and the steam railway train.

It is an example of this ability to overcome both time and distance that has recently called forth a striking editorial comment from one of our most prominent newspapers. Alluding to the remarkable condition of affairs existing in the stock market, the primary cause was stated to be the use of the telephone. Formerly general conditions demanded action along certain lines, and in so far as these conditions were understood by more or less isolated individuals, movements were initiated in the same direction. These movements, however, were likely to be spasmodic, varying greatly in intensity, and often much obscured by counter-currents set up around centres of different opinions or motives. To-day these minor agencies are constantly in touch with the powers that have placed themselves in the lead. The operations determined upon by the head are carried out simultaneously at innumerable points, and the knowledge of the effect of each step is almost instantly added to that from every other source of information, to assist in the further development of a well outlined single plan. From such a concentration of initiative and co-ordination of activity comes the immense power of the great modern trust. The ability of a huge corporation to rapidly grasp the significance of a situation, conceive a plan, and execute a movement depends upon the telephone.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. MCMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

REASONABLENESS OF REGULATIONS.

Our telephone company also does a general messenger business. We have a rule that our instruments shall not be used for calling messengers except from our own office. Another of our rules is that our telephones shall not be used for transmitting or delivering any message in respect of which any toll has been or is to be paid to any party other than the company. We have been having some controversies with subscribers over these rules and would like to know your opinion as to whether they are reasonable or not. R. C.

IT is the editor's opinion that the first rule you mentioned is unreasonable, as a general messenger business is quite distinct from the business of transmitting messages by telephone and is not necessary for the proper conduct of the telephone business. The latter regulation seems reasonable and would not interfere in any way with the regular occupation of your company in the transaction of a telephone business. For a case in point see People vs. Hudson River Telephone Co., 19 Abb. N. C. 406.

LIABILITY FOR DAMAGES BY LIGHTNING.

In the issue of THE AMERICAN TELEPHONE JOURNAL for January 6, under the heading of "Liability of Telephone Company for Injuries from Lightning," you call attention to certain cases on this subject. Another case on this same subject is that of Cumberland Telegraph and Telephone Company v. Martin's Administrator, decided by the Court of Appeals of Kentucky in 1903, and reported in 76 S. W. 394, also in 63 L. R. A. 469. I. L. A.

THE facts of the above cited case are as follows: Deceased took refuge from an electric storm under the porch of a store. He placed his back against an iron grating over a window and was subsequently killed by lightning which struck one of the defendant's telephone poles near the store and was conducted to the porch by a wire negligently maintained over the metal roof thereof, and from the roof to the iron grating, and thence to deceased. Held, that deceased was a bare licensee in the place where he was killed, and that defendant owed him no duty to properly maintain the wire.

DANGER OF CROSS TALK DID NOT JUSTIFY INJUNCTION.

AT Nacogdoches, Texas., the Russell Telephone Company, of Cushing, was caused to appear before Judge Berger and show cause why an injunction should not be issued restraining that company from operating a long distance telephone line from Cushing into Nacogdoches. The plaintiff in the case, the Texas Central Telephone Company, alleged that the competing line since it had been constructed would probably cause confusion over its line by "cross talk." Both sides were ably represented by counsel, and after the evidence had been introduced Judge Berger refused to issue the writ as prayed for.

VOID LICENSE TAXES IN MILWAUKEE.

THE city of Milwaukee is authorized by its charter to control and regulate its streets and under this supposed authority adopted an ordinance imposing an annual license tax on telephone companies operating lines on the streets as authorized by revised statutes of 1898, section 1778, granting all telephone companies the right to operate lines on the public highways on payment of one dollar for every pole maintained on the streets. The ordinance provided that the revenues derived from licenses should become a part of the general city fund. There was nothing to indicate that the license was for supervision and the aggregate amount sought to be collected greatly exceeded the balance of supervision. The court held that the provision of the charter was no authority for the city to exact a license from a telephone company, and that the ordinance was a revenue measure and void because not within the powers confirmed by the charter. Said the court: "Even if the city had the right to impose reasonable charges for inspection and supervision it should not be permitted under the guise of such power to collect large amounts of revenue for the benefit of the city, regardless of the amount necessary for such inspection and supervision and where the court can clearly see that revenue and not supervision is the aim and not the incident, and no power is given to license the occupation, the ordinance is void." Wisconsin Telephone Company vs. City of Milwaukee, 104 N. W. 1009.

TELEPHONE A HOUSEHOLD NECESSITY.

A TELEPHONE is a household necessity, just the same as sugar, or flour, or coal, and any eatables that are placed upon the table. The placing of the telephone upon the list of household necessities makes it mandatory upon the husband and the wife to pay for the same. This is according to a decree rendered in Justices' Court at Sterling, Ill. The Interstate Telephone Company brought suit against Mr. and Mrs. Perry Underhill to recover a certain amount of money due the company for telephone rental. The attorney for the defense maintained that the wife could not be a party to the suit, hence the suit was null. The Judge decided that the telephone is a household necessity, or as he described it, a "household expense." Therefore both husband and wife are liable for the debt incurred by the use of a telephone.

CITY CANNOT DISCRIMINATE BETWEEN COMPANIES IN ORDERING UNDERGROUND CONDUITS.

JUSTICE ANDREWS, at Syracuse, N. Y., has decided a telephone pole case from Carthage. It was the action of the Village of Carthage against the Central New York Telephone and Telegraph Company. The motion was to vacate a temporary injunction restraining the defendant from setting poles in the streets of Carthage and from attaching to any poles set since January 1 last anw cross arms or wires. The Carthage Board of Trustees had passed a resolution granting permission to maintain an exchange(but "by means of a conduit under the street only." However, in Carthage there is another telephone company which has an overhead system and the village did not compel that company to change to an underground system. Justice Andrews holds that it is well settled that a telephone corporation incorporated as the defendant has the right to use the public streets and highways of the State for its lines. This right is granted by the State, not by the city or village through which its lines may pass. It is also well settled that this right is subject to reasonable control by authorities of municipalities. This proposition is discussed at length. The complete control of streets is in the Legislature, and if the Legislature chooses to authorize their use for any public purposes, the consent of the municipality is not required. As the village of Carthage had assumed to require one company to put its wires underground in the same streets in which the other had open air construction, it is held to be an act that cannot be justified, even assuming that the matter is within its jurisdiction. So the injunction was vacated with costs.

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IN THE OPERATING FIELD

MEETING OF FIFTH DISTRICT OF THE ILLINOIS INDEPENDENT TELEPHONE ASSOCIATION HELD AT PEORIA.

THE meeting of representatives of Independent telephone companies operating in the counties of Woodford, Peoria, Logan, Tazewell and Mason was held at Peoria on January 5 and 6. At this meeting consideration was given to the question of the adjustment of toll rates throughout the district and, incidentally, throughout the entire state. The plan as advanced by the toll rate committee, composed of J. S. Dailey of Chillicothe, James Barrett of Pekin and C. A. Camp of Sparland, is that the Independent companies throughout the fifth district unite on a uniform toll rate that shall obtain in all parts of the territory, and establish a clearing house, to be opened possibly in Peoria, from which the earnings will be distributed equitably among the lines participating in the carriage of a message.

Some fifty of the owners and managers of the systems radiating from Peoria attended the meeting and took part in the discussion of the question of merging their interests to bring about the best results. The toll rate committee was continued in service until the April meeting, with enlarged powers, the most important of which are the solicitation of toll connections in all parts of the state and in other and adjoining districts to join in the agreement and accept the articles which will be drawn up by the committee, the reception of whose report will be made the order of business at the next meeting of the association.

In the five counties mentioned, which compose the Fifth district of Illinois, are 30,000 telephones, which are connected up with 6,000 miles of toll lines. These telephones are owned by about sixty-five Independent companies, which operate in all 108 exchanges. Extensions and new toll lines are being planned which will materially increase the area capable of being reached by long distance messages from this region.

ATTICA, INDIANA, COMPANY IMPROVING ITS SYSTEM.

EXTENSIVE improvements are being made by the Attica, Ind., Telephone Company. To facilitate its toll business a new toll board is being installed to which will be connected a number of new circuits reaching out into the surrounding country. A line has been built to Riverside and will be extended to Independence. This will greatly facilitate the business conducted between the three towns, as heretofore the lines used passed through two towns en route. New poles are being secured and these will be used for reconstruction. Ultimately all the circuits will be changed over to full metallic and therefore every improvement being made at present is being done in a most substantial manner.

NEW INDEPENDENT COMPANY WILL BUILD LINES IN MAINE.

INDEPENDENT telephone service is being developed in the New England States in a manner which points to its gradual extension over the whole of this territory. In the state of Maine a very comprehensive system of toll and local service is being built up and new companies are constantly being formed. One of the latest is the Lewiston, Greene, and Monmouth Telephone Company. It is said to have planned to build and mantain a system which will operate in the following cities and towns: Auburn, Lewiston, Turner, Lisbon, Webster, Wales, Greene, Leeds, East Livermore and Livermore in Androscoggin county; Buckfield and Hartford in Oxford county, and Litchfield, West Gardiner, Gardiner, Monmouth, Farmingdale, Hallowell, Augusta, Manchester, Vassalboro, China, Sidney, Waterville, Oakland and Lewiston, Greene, Wales, Leeds, Readfield, Wayne and Winthrop in Kennebec county. The main toll routes are to be from Lewiston through Greene, Wales, Leeds and Monmouth to Winthrop; from Lewiston to Auburn; from Greent to Turner; to Buckfield and to Hartford; from Monmouth through Litchfield and West Gardiner to Manchester; from Winthrop through Manchester, Augusta, Sidney, Vassalboro and Waterville to Oakland; from Monmouth to Wayne and from Greene to Webster, and through all the other cities and towns above named.

The capital stock of the corporation is $10,000, of which $9,000 is common, with a par value of $10 a share. Among the list of stockholders are the following: Eli Hodgkins, of Greene; R. Alden, of Winthrop; H. M. Blake, of Monmouth; J. H. Gilman, of Monmouth; H. E. Merrill, of Monmouth; A. H. Bailey, of Winthrop, and H. E. Foster, of Winthrop. The officers of the corporation are: President, R. Alden, of Winthrop; treasurer, H. M. Blake, of Monmouth; directors, R. Alden, Eli Hodgkins, A. H. Bailey, H. M. Blake, J. H. Gilman and H. E. Foster.

KEYSTONE OF PHILADELPHIA SHOWS INCREASE IN EARNINGS.

IN the annual report of the Keystone Telephone Company of Philadelphia, read at the stockholders' meeting, the earnings of the company for the fiscal year ending Dec. 31, 1905, showed a substantial increase over those of the previous year. Gross earnings increased $64,795, and net earnings $18,588 over those of last year. A total of $639,370 was expended in extensions to the plant during the year. The total credit to profit and loss up to Dec. 31 was $292,578. There are 19,000 telephones in use and it is expected that 6,000 will be added during 1906. The company owns two hundred and seventy miles of conduit.

TRAIN COLLISION AVERTED BY USE OF THE TELEPHONE.

WHAT might have been a serious and costly wreck with loss of life on the Southern Indiana Railroad is reported to have been averted on January 10 by the thoughtful use of the telephone. The engineer of an eastbound freight train ran by a flag station. A westbound train with orders giving it the right-of-way was flying toward the incoming freight train. The agent at the flag station bethought himself of a farmhouse along the line that was connected with the station by telephone. He quickly called up the farmhouse, and requested that a messenger be sent immediately to flag the eastbound train. This was done just in time to prevent the coming together of the trains, which would almost inevitably have occurred within a few moments.

AN EXAMPLE OF RAPID INDEPENDENT DEVELOPMENT IN NEW YORK STATE.

THROUGHOUT New York State there are many Independent systems which furnish telephone service to a large proportion of the inhabitants. By a careful consideration of the needs of the communities in which they operate these companies have secured the lion's share of the business. An illustration of the progressiveness of Independent telephony is to be found in the Wellsville Telephone Company's exceptional growth.

Work was begun on the plant in the spring of 1901 and in the fall of the same year telephones were connected and service given. On the first day of January, 1902, seventy-five subscribers were receiving service.

By the end of that month twenty-five new parties were added

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to the list. And so the growth continued until in 1903 a new 100 line section was added to the switchboard, and in August, 1905, the third section was installed. This position is devoted to trunk and rural line service, leaving the other two positions for the local lines There are at present fourteen rural lines terminating in the Wellsville exchange, and these connect with upwards of 150 subscribers in the surrounding country.

The long distance lines connect direct with all the important towns in the northwestern part of the State. Among the many towns which can be reached are Elmira, Binghamton, Syracuse, Auburn, Buffalo, Rochester, Jamestown, Warren, Erie, Titusville, Oil City, Kane, Bradford, and Hornellsville. At the present time there are over 600 subscribers who secure telephone service from this exchange. This number gives an average of one telephone to every nine inhabitants.

ILLUSTRATED LECTURES ON TELEPHONE TO BE GIVEN IN SOUTHERN STATES.

FRED T. LOFTIN, formerly press agent and correspondent for the Indianapolis Telephone Company and the New Long Distance Telephone Company, will go into the southern states and give lectures on the value of the telephone. Illustrations from stereopticon slides will be shown. Mr. Loftin's plan is to interest the people in communities where there are few telephones and instruct them how to organize local companies and build local systems. His lecture is void of technical terms and contains many features of great interest to the people who wish to learn the advantages derived from the use of the telephone in rural communities. The social features acquired in an isolated neighborhood, the value of market and weather reports, etc., are well brought out.

INTER-OCEAN COMPANY ISSUES NEW ADVERTISING FOLDER.

A MOST attractive folder has been issued by the Inter-Ocean Telephone and Telegraph Company of Buffalo, with a view to increasing public interest in its service. Upon the front cover is placed the Independent shield and the title "Independent Talks—Published for Your Benefit and Ours." The two inner pages and the back are reproduced upon this page. The paper is white, while the printing is in blue, excepting, of course, the shield, which is reproduced in the standard colors. As the quality of paper and typographical work are of the highest grade the leaflet is sure to make a good impression at first sight, and after that the pointed paragraphs within should in many cases produce the desired interest.

We want to convince you that Talking with us is the Cheapest Product in the World.

We are going to prove to you in Dollars and Cents that if you patronize us you are bound to get Results.

It will prove to you that as a Business getter it has no equal.

It is the quickest and best Salesman you can secure.

For a busy man it's a brain reliever.

We will show you that 500 miles is only a step.

We want to help you secure business and retain it.

You educate your customer. We will do the rest.

We believe you would pay the expense to secure their business.

We reach everywhere big and little.

We know everybody great or small.

We have no enemies.

Don't that speak well?

Our business is prompt, efficient and reasonable.

Get into the Habit.
USE THE
Independent Lines
and let us convince you
THAT THE
Inter Ocean Telephone and Telegraph Company
HAVE
Long Distance Service that is better than any
Other Company.

MERGER OF INDEPENDENT INTERESTS IN ILLINOIS PROVIDES FOR EXTENSION OF SERVICE.

BUSINESS men at Taylorsville and Pana, Ill., are much pleased with the recent merger of the two companies. The Home Telephone Company of Taylorsville has been negotiating for the Pana property for some time, as by its acquisition the local and toll service would be much improved. Morrisonville, Owaneca and Stonington are also included in the consolidation which will result in greatly improved service to the farmers and business men of the surrounding country. Stockholders in the Taylorsville Company are also interested in the Christian County Telephone Company, which is being rapidly developed.

ELEVATOR IN INDIANAPOLIS BUILDING PROVIDED WITH A TELEPHONE.

THERE is one elevator in Indianapolis provided with telephone connections. It is in the Van Vorhis block. The instrument is connected through wires in the cable used for the bells and lights, and is on a regular central office circuit. The object of the owner of the building, Flavius J. Van Vorhis, in having the instrument put in the elevator instead of in his office was for convenience in reaching the custodian and elevator man. The elevator runs to ten o'clock at night, and he can communicate with the men at all hours, no matter where he may be at the time. If the instrument were in the office it would not be available when the custodian was absent and the doors locked. The instrument was installed by the Indianapolis Telephone Company.

INDEPENDENT DEVELOPMENT IN ARIZONA BEING VIGOROUSLY ADVANCED.

NEW business and an increased demand for telephone service have been the causes of a rapid development of the property of the Consolidated Telephone Company in Arizona. At present a good deal of work is being done in the neighborhood of Tempe and also in Gila and Graham counties and in the Imperial valley. At Phoenix the company has 1,012 stations which are greatly used. A test was recently made of the number of calls made in twenty-four hours and the figures are interesting. From 8 p. m., December 26th, to 8 p. m., December 27th (twenty-four hours), 14,682 completed connections were made. This number does not include the attempts to secure a number or the times a line was found to be in use. The average time on the same date to secure a connection was 5¼ seconds. The company is putting in operation plans for keeping its service at a high standard of efficiency, and extending its lines with a view of furnishing a comprehensive and satisfactory service to this whole region.

SECOND CONVENTION OF VERMONT AND NEW HAMPSHIRE INDEPENDENT TELEPHONE ASSOCIATION.

THE Independent telephone men of Vermont and New Hampshire met on January 16th in Woodsville, N. H. There were over forty persons present. The organization is progressing rapidly, on a good firm basis, and much interest was shown. Several new members joined the association at the time of this convention. The principal business before this meeting was the adoption of by-laws, and other conventions will follow to complete the organization and map out plans for future development.

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QUERIES

METHOD OF LOCATING CROSS BEYOND BRIDGED BELL.—(649.)

Will you kindly enlighten me through the Queries and Answers of your journal, of which I am a subscriber, as to the formula for obtaining a reckoning of the distance beyond an office which is closed for the night, at which a 1,000 ohm bell is bridged across the line, of a solid and permanent no resistance cross, such as would be caused by breaking a transposition glass allowing wires to cross at an unknown point beyond the bell and to which the testing station was unable to obtain a pair of test wires around behind the cross?

For instance, testing station A, where galvanometer is located, finds himself unable to ring station C, and station B being closed for the night is unable to cut the pair through for test at B. However, from previous knowledge he knows that there is a 1,000 ohm bell across the line at B, and has C to open the pair preparatory to a measurement and calculation by the distance table and wire gauge which is a matter of previous record. For convenience use calculation of 10 ohms per mile per pair, allowing distance of 50 miles from testing station A to closed station B. J. T. E.

Let us assume that the bridge at A shows a reading of 700 ohms. Under these circumstances deducting the wire resistance between A and B, or 500 ohms, we know that were the bridge measurement taken at B, the reading would be 200 ohms. This 200 ohms, called known resistance, must consist of 1,000 ohms shunted by an unknown resistance. To find this unknown resistance multiply the known resistance by the resistance of the bell and divide the product by the difference between the resistance of the bell and the known resistance.

For the above example:

$$\frac{1{,}000 \times 200}{1{,}000 - 200} = \frac{200{,}000}{800} = 250.$$

With wire at 10 ohms to the mile circuit resistance, this would give the fault as 25 miles beyond station B.

It would be perfectly possible to continue this process if there were more closed stations between A and C placed at known distances. We would simply take the result obtained by correction for the first bell as above described and use it as a basis to correct for the second bell, by repetition of the above process.

The case of locating crosses on a long line with bridged bells, of which the above is a sample, may well deserve the more serious attention of wire chiefs, as it occurs very often in actual practice, and in few cases do the wire chiefs attempt to make locations, being afraid of the calculations involved. This matter is not, however, as difficult as it might at first appear.

If a record is made up of each line, giving the loop cross resistance at each bridged station, no calculation is necessary, since, if we subtract from the measured value of the cross, the loop

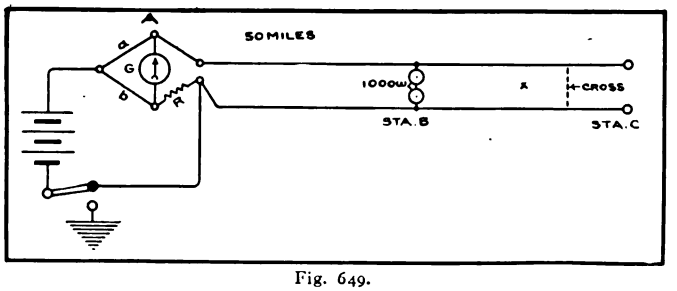

Fig. 649.

cross resistance of the station which is next lower in value, the difference in ohms may be figured directly from wire resistance into miles beyond that station. It will be seen that the opening of the line at the far end is totally unnecessary, since, if the line were loop-crossed the opening and closing of the far end would not affect the bridge reading.

Should it be inconvenient to obtain measurements of loop-cross readings at the various stations, these may be readily computed in the following manner:

Let d=wire resistance to first station.
Let d_1=wire resistance between first and second station.
Let d_2=wire resistance between second and third station.
Let m=resistance of bells.
Then d=loop cross resistance of first station, and

$$d + \frac{d_1 m}{d_1 + m} = \text{loop cross resistance of second station} = p;$$

and $$p + \frac{d_2 m}{d_2 + m} = \text{loop cross resistance of third station, etc.}$$

By continuing the process the loop cross resistance of any station may be obtained.

RESISTANCE PROBLEM.—(650.)

In the circuit represented in the accompanying diagram I should be pleased to have you give me a solution of the following questions:

1. What is the resistance of the circuit from *a* to B?
2. What current will flow in D and C respectively? J. A. S.

In reply to your first question the resistance of the entire circuit from one battery terminal to the other, neglecting the resistance of connecting wires, is obtained by adding to the joint resistance of the two parallel branches C and D the single re-

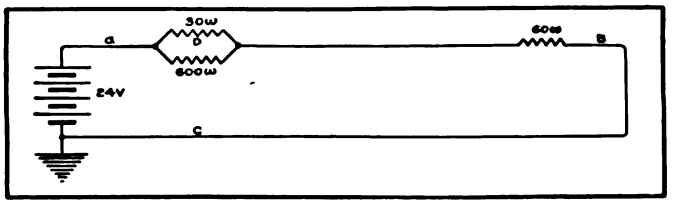

Fig. 650.

sistance 60 ohms connected in series. The joint resistance of the two paths is determined by the well-known formula $R = \frac{r^1 r}{r^1 + r}$

Substituting the values given we have $R = \frac{30 \times 600}{630}$, which gives a value of 28.57+ ohms. Adding to this the third resistance we have as the total resistance of the circuit 88.57 ohms. The current flowing in the circuit will be equal to the electromotive force of the battery, 24 volts, divided by this resistance, giving a value of .27+ ampere. This current will divide in the branch circuit in inverse proportion to the resistances of the separate members of this circuit. That is to say the current passing through the branch of smaller resistance will be twenty times as great as that in the higher. Therefore, as twenty parts pass through the smaller resistance, and one through the larger, the actual value of the current in the 600 ohm branch will be $\frac{.27}{21}+$ ampere, or .0128 ampere, while the current in the 30 ohms branch will be twenty times as great, or .256+ ampere.

BATTERY DEPOLARIZATION.—(651.)

Will you kindly answer the following queries concerning the depolarization of cells of a certain type of wet battery?

1. What benefit is derived from the manganese dioxide being inside of the carbon cup?
2. To what extent does the manganese dioxide assist in the depolarization? H. H.

In such a type of cell the manganese dioxide is mixed with hard granular carbon; therefore the negative electrode is composed of both the carbon that forms the cup and the granular carbon inside of the cup, the latter being considerably in excess of the former. Since a cup of this type is made of very porous carbon, the depolarization takes place in the same manner as with

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those cells in which the cup is made up of porcelain or clay.

When the circuit including the battery is closed a chemical action takes place by virtue of which the zinc combines with the chlorine of the sal-ammoniac, simultaneously releasing hydrogen and ammonia. The latter gas dissolves in the water until no more can be absorbed, after which it escapes into the air. The hydrogen, by electrical attraction, is caused to penetrate the inner vessel, where it comes in contact with the manganic oxide. This it deprives of its oxygen, forming water and sesqui-oxide of manganese. The entire action may be represented by the chemical equation,

$$Zn + 2NH_4Cl + 2MNO_2 = ZnCl_2 + 2NH_3 + H_2O + Mn_2O_3.$$

As polarization is due to the presence of hydrogen upon the negative electrode, it takes place when the amount of hydrogen liberated is given off at a faster rate than the manganic oxide can be decomposed.

The carbon is supposed to contribute to the intensity of the action by which the manganic oxide is decomposed without undergoing any chemical change itself, in a manner which is not thoroughly understood. The depolarization of the exterior carbon of the cup is assisted by the movement of the liquid in the jar, which brushes away the hydrogen bubbles from the surface of the carbon. With the removal of the hydrogen counter electro-motive force, or polarization, due to its presence disappears.

HOW WOULD YOU LIKE A TELEPHONE FREE? A NEW BELL GIFT WITH A STRING ATTACHED.

(*Continued from page 59.*)

company charged for installation? And this comes from the Cumberland—the company whose boast it is that it fears no competition. It must indeed at last be driven to desperate straits. In Louisville the Independents have triumphed beyond all the dreams of their associates. Their competitor dares not show his face. The Cumberland is driven to the last stage of flight—where like the foolish ostrich it hides its face, and can find no better concealment than a flimsy paper mask.

TELEPHONE COMMUNICATION IN BEDFORD COUNTY, VIRGINIA.

By William R. Tyree.

BEDFORD COUNTY, Virginia, is yet in its infancy in the construction and operation of county telephone lines, there having been heretofore little local interest and less local capital invested in this well-paying enterprise. However, during the past two or three years there has been a general awakening in this great civilizing feature for all classes, and along this valuable line of progress for a class of people throughout a large and prosperous county. This, like other sections of the State, is becoming more and more dependent upon the county telephone.

At present the county is served by two companies still in an embryo state, one operating north, and one south of the Norfolk & Western Railway Company's tracks, running from east to west, which divide the county of Bedford, so far as these two separate lines are concerned, into two separate and distinct districts. Both of these lines run their wires into Bedford City—a town of three thousand population—the county seat of Bedford County.

The Bedford Southside Telephone & Telegraph Coporation was chartered in the year 1904 with A. J. Gillaspie as President; Dr. S. H. Price, Vice-President, and T. W. Richardson, Secretary and Treasurer. Its object is to gradually extend its lines throughout the entire southern section of the county; to have a common switchboard connection in Bedford City with the Municipal and Northside Company, which will, likewise, give it a connection over the whole State; to increase the number of its telephones, and the extent of its wire mileage.

At prsent the Southside company has only one telephone in Bedford City. From it a metallic circuit line runs directly south to Gillaspie, thence to Pollard and toward the Campbell County border, embracing in all twenty-nine miles of wire and twenty-four telephones. These rent for $1 per month for residence and $1.50 for merchants, bringing in a revenue of $360 per year.

On the other hand, the Big Island & Bedford City Telephone Company, whose operating field extends entirely into the northern part of Bedford County, has a slight advantage in operation, it having been constructed at an earlier date than the Southside company. Its charter was granted in 1903 by the Virginia State Corporation Commission. The officers and board of directors of the Big Island & Bedford City Telephone Company have been chosen from men most in touch with local capital and local business interests of the county. Dr. E. L. Marshall of Big Island, Va., is President; C. F. Logan of Big Island, Va., Vice-President, and D. H. Scott, Secretary and Treasurer, while upon the board of directors are R. S. Turpin, R. Goff, Dr. S. J. Gill, A. M. Trumbo, W. S. Perrow, R. R. Logwood, and A. J. Wheat.

The object of this line, under its charter, like that of the Southside company, is to, in time, extend its wires, in direct and branch lines, through the entire northern section of the county.

As the telephone world can readily see, there still is much room for development in telephonic communication in Bedford County, but that the start has been made is a certainty, and in a few years we may expect that these lines, now so entirely separated from one another, will run into a common switchboard—located at Bedford City—and thus give its residents facilities for placing themselves in telephonic communication with every section of Virginia.

MEETING OF NORTHWESTERN CEDARMEN'S ASSOCIATION.

ON January 9 the tenth annual meeting of the Northwestern Cedarmen's Association was held in Minneapolis. The meeting was well attended, and the amount of business handled and the reports read showed that many important benefits had been due to the organization, and employment of a permanent secretary during the past year. In the report of Secretary M. O. Nelson was a statement of the sales for 1904, which make up a total of 603,000 seven-foot to eighteen-foot posts, and 290,000 poles in lengths of 20 feet and upwards.

It was quite evident that the cedarmen are anxious to obtain information of this nature, and are willing to co-operate in its collection, since 74 responses to requests for reports of sales for 1904 were received, and to that for stocks for 1905, 63 responses, and to that for dry stocks on hand January 1, 50 responses. In addition to this, it was stated that 50 wholesalers sent in their replies within a single week.

The plan whereby the estimate of posts and poles put in the current winter was obtained, is one suggested at the last April meeting, and discussed previous to that time by the association. This is to divide the cedar-producing territory into districts, giving to some wholesaler, who is familiar with that district, the task of estimating the cut of the winter there and the cut of the previous year. This obviates the overlapping of estimates and covers all the territory, though in a rough way. These estimates are based on average logging weather. Last year the estimate was made up from reports of individuals, each operator giving a report of his own cut only. In the report at the end of the logging season the secretary is ready to use either or both methods, as the association may think best.

Reports of various committees dealing with matters of broad interest to the association were read, and, in accordance with a recommendation of a nominating committee, officers were elected as follows:

President, Marshall H. Coolidge; vice-president, P. W. Raber; treasurer, W. B. Thomas; directors for three years, A. T. Naugle and W. T. Watkins.

APPROPRIATING WIRES.

AT Hopkinsville, Ky., A. B. Johnson sues for $2,000 damages from the Ideal Construction Company and the Hopkinsville Home Telephone Company, alleging that last May they cut and appropriated wires which belonged to a private telephone system which had been constructed in his neighborhood.

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TELEPHONE PATENTS

TELEPHONE.

Charles G. Burke, Brooklyn, N. Y., patents (No. 809,423; dated Jan. 9, 1906; filed Sept. 16, 1901; serial No. 75,434, and assigns one-half to John Q. A. Whittemore, Boston, Mass.), a telephone receiver.

The novel feature of this device lies in the coil windings of the magnet. Of these there are two, one of fine wire wound next to the core, and the other of coarse wire laid over the first. In this way an induction coil is formed which the inventor states is shown by his experience to aid in increasing the loudness and clearness of the reproduced speech. The two windings are brought out to four binding posts. The inventor claims that by the use of two receivers, one being of the ordinary type, additional advantages are secured. A diagram showing connections is included.

The second receiver when used is to be connected between one terminal of the primary winding and one secondary terminal. The two sides of the metallic line are to be connected one to the remaining terminal of the primary winding and one to the free terminal of the secondary, respectively.

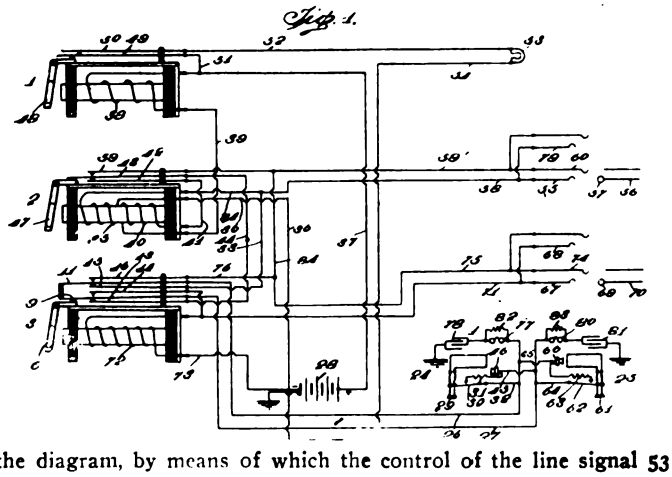
TELEPHONE SYSTEM.

Robert H. Polk, Birmingham, Alabama, patents (No. 807,316; dated Dec. 12, 1905; filed Jan. 19, 1904; serial No. 189,693) a telephone system.

The object of this invention is to provide two parties on a metallic line with individual ringing circuits. Besides the usual line relay, *1*, there are two auxiliary relays, *2*, *3*. The circuit is complex, but the following explanation will assist in the understanding of its operation. Relay *3* has six contact springs, two of which *9* and *11* can be made to open and close circuits by movement of the relay armature *6* in a similar manner to a regular type key.

Relay *2* is differentially wound. Its use will be stated later. Each of the two parties on a line has an individual multiple jack; station 24 utilizing 67, 68, and station 25, jacks 79, 55.

When either station calls the exchange, a circuit is formed through relay contacts, battery, and relay windings as indicated in



the diagram, by means of which the control of the line signal 53 is effected. To call station 24, for example, the operator plugs into jack 67 or its multiple, 68, and puts positive battery on wire 71, which traverses winding 72 of relay 3 back to negative battery. Armature 6 is attracted and contacts 13, 9 and 15, 11 are broken, while contacts 9, 14, and 11, 16 are closed. Alternating current is then applied to the sleeve circuit 75, which traverses contacts 16, 11 of relay 3 wire 26, bell and condenser of instrument 24, to ground.

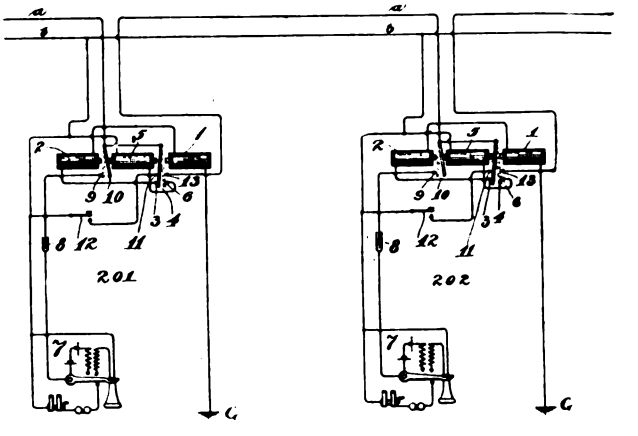
To signal station 25, the operator plugs into multiple jack 79 and positive current then flows from the tip 57 over wire 58, wire 34, winding 35, back to negative battery. Relay 2 is then energized and closes contacts 43, 59. The operator then sends alternating current over wire 59, which traverses contacts 59, 43, wire 44, contacts 13, 9, line 27, bell and condenser of station 25.

Impedance coils of approximately 250 ohms. are suggested by the inventor to bridge the bell coils. Their object is to provide a shunt path for the condenser discharge which occurs when a receiver is removed from the hook of another telephone, this discharge being an annoyance on account of its causing a momentary tap of the ringer gongs. The effect of these impedance coils upon the ringing of the bells which they shunt is not stated in the patent.

PARTY LINE SYSTEM.

Arthur F. Poole and Frank B. Hall, Wheeling, W. Va., patent (No. 810,346; dated Jan. 16, 1906; filed Oct. 13, 1902; serial No. 127,114) a party line signalling system.

This patent discloses means for selectively signalling a party on



a party line and for a party to signal the exchange. Referring to the illustration the line wire *b* is legged to all stations, but the line wire *a* is looped into each in such a manner as to be normally open between any two stations. This will be understood by tracing the circuit. At station 201 the circuit from wire *a* passes through armature 4 of magnet 5, through windings of magnets 2 and 1 to ground. The continuation of *a* to station 202 is broken at contact 13, station 201. In signalling a subscriber the operator by selective mechanism at the exchange closes the open contacts of the line *a* up to the desired station. In calling the exchange a subscriber closes key 12, which completes a circuit from wire *b* through coils of magnets 2 and 1 to ground, thus signalling the exchange. The subsequent operation of the system depending upon the manipulations of the exchange apparatus which is too complex to describe herewith, owing to the necessity of referring to numerous numbered drawings, we would suggest that parties interested procure a copy of this patent. Numerous claims covering the principles of operation at the central office and at the substations are included in the patent.

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FOR SALE—February 1st we will cut over the central energy and will sell all or a part of the following: Kellogg Magneto Express Switchboard, Lamp Transfers, Seven Positions, 150 numbers each; Kellogg Iron Distributing Frame, capacity 1,250 numbers, with 900 arresters installed; Holtzer-Cabot, Direct Connected Motor Generator, Charging Machine; Holtzer-Cabot Direct Connected Motor Generator, Ringing Machine; Four Cells, No. E-9 Chloride Accumulators, Marble Power Board, 900 Magneto Telephones. This apparatus is practically new, and at present in operation, giving good service. It can be seen and examined by parties interested. Address Lynchburg Telephone Company, S. H. D. Freed, Manager, Lynchburg, Va. 517

SUPPLIES WANTED

WANTED—Eight second hand magneto telephones in good working order. State price and make, and how long in use. Address Box 511, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 511

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WANTED—Position as manager and lineman with company of 200 or 300 telephones. Have had five years' experience and can give A1 references. Am married, steady and sober. Address Box 483, Story Co., Collins, Iowa. 528

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THE best resolution a man can start the New Year with, is to secure the position for which he is best adapted. Our business is to help you find that place. We may now have it among the thousands on file at the various offices in the larger cities. If your name is not listed with us, it should be. Write us for information to-day. HAPGOODS, Suite 511, 309 Broadway, New York City. 464

WANTED—Position as manager of common battery exchange. Practical telephone and good business man. Have good record. Would not consider less than $100 per month. Address Box 526, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 526

WANTED—A manager. First class opportunity for right man. Give references, state age, experience and salary expected. Address Box 529, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 529

WANTED—Position as manager. I am not a technical man but a thorough business man; understand construction work in every detail, know what business is and how to get it; a master of details, quick and accurate in emergencies; thorough in system and discipline. Can "make good" in any position of responsibility where energy, fidelity and brains are needed and appreciated. Let me give you my experience and references. Address Box 533, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 533

WANTED—Man competent to manage five telephone exchanges, having 3,600 telephones in service, with headquarters in Kansas City. State experience and references. Address Kansas City Home Telephone Company, Kansas City, Mo. 534

WANTED—Experienced telephone men of good appearance and address as traveling inspectors for the Engineering Department. We need men to fill vacancies caused by recent promotions. Address George J. Yundt, Engineer, Southern Bell Telephone & Telegraph Company, Atlanta, Ga. 530

WANTED—Position as manager. Have had experience from the ground up. At present manager of an exchange of 1,000 subscribers, but desire a change. Good references. Address Box 532, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 532

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

INTERIOR SYSTEM TELEPHONES.

THE S. H. Couch Company, Inc., of Boston, has met with such success with its interior apparatus that it has been obliged to enlarge its present factory in order to meet the increased demand for apparatus of this type. The few working parts and the positive contacts in these telephones are said to have contributed much to their popularity, and the following cuts and description will give some idea as to their simple construction.

In Fig. 1 is shown the general arrangement of the wall set. It is stated by the manufacturers that as there are no floating contact springs, all springs being under tension at all times, they cannot get out of adjustment. When a button is depressed the spring connecting with the talking circuit, which is common to all sets of springs, makes a contact with the line spring and forces it down until it makes contact with the ringing bar. When the pressure is removed these springs leave the ringing bar, but are held in contact with each other by the catch plate. When the receiver is replaced, or another button is pressed, the button springs resume their normal position.

The arrangement of the interior of the wall set is shown in Fig. 2. Every working part, as well as all connections, are exposed the instant the box is open. The buttons and surface contacts of all working parts are of metal, thus doing away with hard rubber or composition, which is so likely to expand and become sticky. The battery and line wires enter through a hole in the lower part of the base, connecting directly to the line springs. As there is a space under the switch mechanism plenty of slack wire can be left in the instrument, which is a very desirable feature when the cables are run on the exterior of the walls in rooms where this method of wiring is permitted.

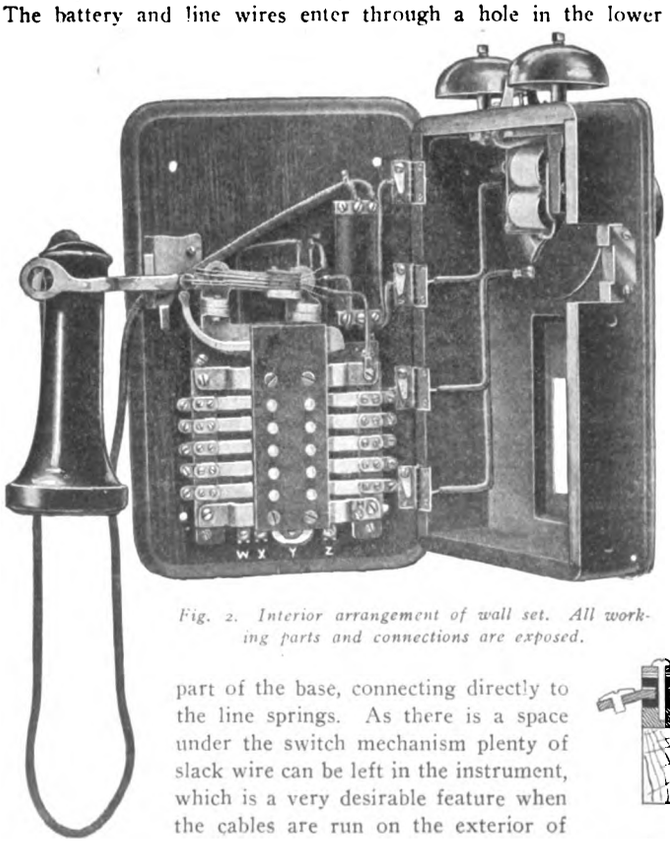

Fig. 2. Interior arrangement of wall set. All working parts and connections are exposed.

A portable desk type with the cover removed is represented in Fig. 3. This desk stand has a capacity of 26 lines, but its simple construction and few working parts are said to preclude any possibility of the trouble which always arises from a multiplicity of spiral springs and weak contacts. As in the wall sets there are no floating springs, and by removing the cover and base plate, every part is accessible and in full view. A flexible cable connects to the springs which are mounted on a circular fibre ring.

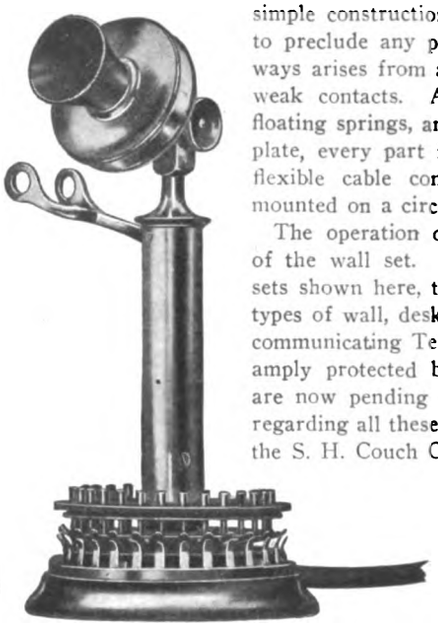

Fig. 3. Portable desk stand and 26 line switch.

The operation of the desk set is similar to that of the wall set. In addition to the wall and desk sets shown here, the complete line includes 10 other types of wall, desk and flush Automatic Reset Intercommunicating Telephones. These telephones are all amply protected by patents, and additional patents are now pending on the same. Further information regarding all these types can be readily obtained from the S. H. Couch Company, Inc., Boston, Mass.

ADDITIONS AT TOLEDO.

THE Home Telephone Company at Toledo, O., reports a very prosperous year, due to the large and rapid increase in the number of its subscribers.

Not long since the original equipment was increased from 6,000 to 7,000 lines, and now comes another order to still further increase the equipment about 1,400 lines, making 8,400 to be installed immediately. At this rate of progress it will not be long before the main office will have reached the limit of its switchboard capacity of 12,000 lines.

In addition to the regular line equipment there are many private branch exchanges in the city, having from 20 to 150 telephones each. There is also the exchange at East Toledo of something like 2,000 lines. The equipment at Toledo, furnished by the Sterling Electric Company of Lafayette, Ind., appears to be satisfactory to stockholders and subscribers alike, and this is claimed by its manufacturers to be a strong argument in favor of the impedance coil, single relay system. The simplicity of the apparatus can be judged by the fact that for 7,000 lines now installed on the main board only 7,000 relays—which also act as impedance coils—are required.

THE ELECTRIC APPLIANCE COMPANY, Chicago and San Francisco, is placing on the market a new model combined lightning arrester, fuse block and switch cut-out, with porcelain base. This device has been approved by the National Board of Underwriters.

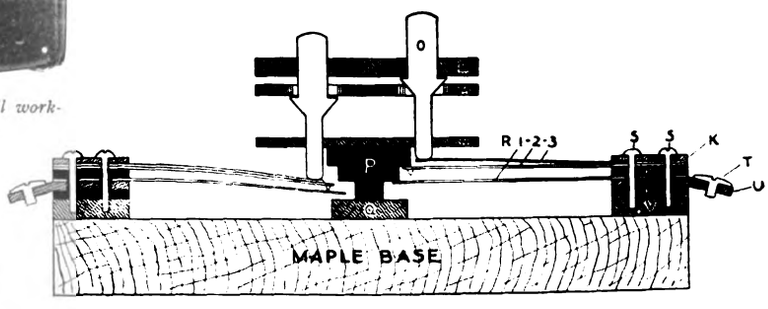

Fig. 1. Arrangement of wall set springs.

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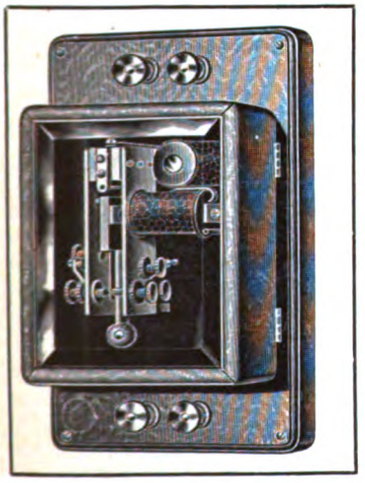

That the Sandwich Pole-Changer, "while its appearance in the cut is strikingly similar to the Illinois," it is a very different and much better instrument. The Sandwich Pole-Changer Company is not the successor of the Illinois Electric Specialty Company. They simply purchased the tangible property of the Illinois Company last June, who had been doing business at a loss for several years, and this is the reason why *their suit went by default.*

The Sandwich Pole-Changer was put on the market by E. C. Hennis, who employed the most careful and able Patent Attorneys to see to it that this instrument was absolutely non-infringing, and it infringes no patent, then or since issued on Pole-Changers.

The Sandwich Pole-Changer Company is strongly backed financially, and is placing these instruments on the market by the hundred each month, and will protect the interests of its customers and users, as well as its own, to the end.

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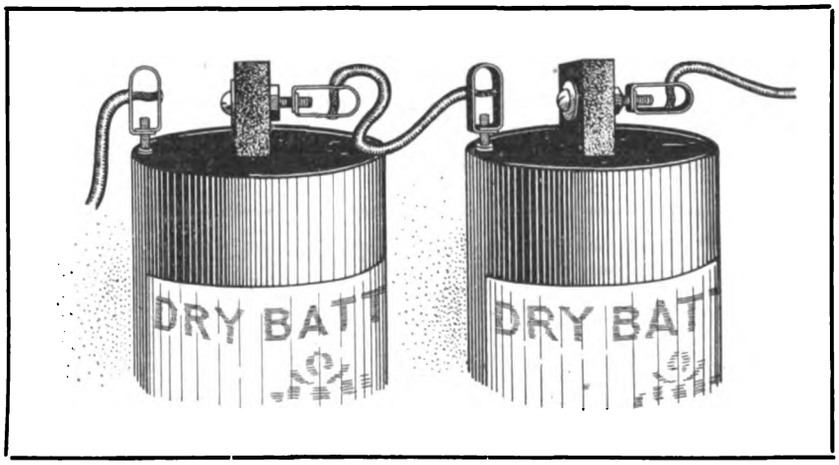
IN THE MANUFACTURING FIELD

A NEW BATTERY CONNECTOR.

MAKING connection between the different cells of a battery has always entailed more or less trouble. The jumper wires had to be skinned and thoroughly cleaned, and even when put in position, there was always the possibility of the binding screws working loose. To overcome these difficulties and at the same time to produce a connector which would be simple in design has been the endeavor of many inventors with varying success. A connector, known as the "Bulldog," is being placed on the market by the American Electrical Novelty and Manufacturing Company, New York, which offers an excellent solution to the problems involved. It consists of a piece of spring copper, bent in the form of a U, with the ends bent inwards at right angles. Through the ends holes are drilled just large enough to admit the regular screw binding post. To place it in position, the ends are pressed together until the holes come in line, when it can be readily slipped over the screw. Releasing the pressure the two arms grip the liberated portion of the post securely. With this arrangement no nuts are required, and at the same time, an excellent mechanical and electrical connection is secured. A short piece of insulated wire is soldered to each pair of connectors, so that they are available for immediate use at all times. Further particulars and prices will be furnished by the manufacturers upon request.



Bulldog Battery Connector, Designed for Making Firm Connections in a Minimum Length of Time.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, ROCHESTER, N. Y., AND CHICAGO, ILL., has recently issued Bulletin No. 14, which deals with private branch exchanges. In a very thorough manner the subject of installations of this character is taken up and well analyzed. In fact, the publication is intended for the use of managers as a reference work. Following the introduction comes a description of the equipment, each part from relay covers to cabinets being treated separately. Then the description of the standard type of private branch exchanges is taken up in detail. Of these twelve are illustrated with halftone engravings and cross section drawings, giving dimensions. The bulletin concludes with specifications for power switchboards and a summary which is intended to act as a guide for equipment when placing an order. Managers and others interested can secure a copy by addressing the company.

THE ELECTRIC APPLIANCE COMPANY, Chicago and San Francisco, is mailing a folder, dealing with the 1900 battery, which it handles. It claims that eighteen years of experience in manufacture has brought the type of cell to a point where it can be depended upon to give better service with least trouble and a saving of money. The firm will be pleased to place trial orders or furnish quotations upon barrel lots.

THE BAIRD MANUFACTURING COMPANY, 6 Michigan street, Chicago, announces that the Seward County Telephone Company ing the Baird Secret-Service system on its rural lines, The fact that the Beaver Crossing exchange where these instruments are being installed is within 30 miles of Lincoln, Neb., and the Lincoln Telephone Company is using over 300 lock-out telephones manufactured by the Baird company is pointed out to show that the system recommends itself to those who observe it in practical operation with considerable force.

GENERAL STORAGE BATTERY COMPANY ENLARGES PLANT.

WE are informed that on account of the great increase in the demand for its Bijur "High-Duty" elements, the General Storage Battery Company has decided to enlarge its factory at Boonton, N. J., by erecting buildings furnishing an additional 48,000 square feet of floor space, and to install hydraulic, and steam or gas generating machinery, aggregating over 1,000 horse-power.

THE SWEDISH AMERICAN TELEPHONE COMPANY announces that it has recently moved to 1760 East Ravenswood Park, Chicago. All correspondence relating to the high-grade telephone apparatus manufactured by this company should be forwarded to its new address.

THE WESCO SUPPLY COMPANY of St. Louis, Mo., announces that it has made arrangements for the southwestern agency for one of the largest and oldest manufacturers of telephone cable, and is prepared to quote the lowest prices on any quantity of cable to meet any desired specifications, and to make immediate deliveries from a large stock which it will carry at St. Louis.

THE FAHNESTOCK ELECTRIC COMPANY, 132 Havemeyer street, Brooklyn, N. Y., is distributing a three-page folder, which describes its spring type binding posts. Three different types are illustrated. No. 4, intended for small and medium size wire is the size used on dry cells; a sample of this will be sent free upon request. No. 7 is somewhat larger and will take wire up to No. 5 B. and S. in size. A sample of this type will be sent to interested parties for four cents. The No. 9 is a duplex post having spring connecting surfaces at both ends, so that it will hold two wires, each of which may be disconnected at will without disturbing the other. This post will hold the same size wire as No. 7 and both these types are made from high copper phosphor bronze. These sizes will be found of value for large wire connections around the exchange. The manufacturer will forward a sample of this type for eight cents. Besides fully describing the uses and advantages of this post, the folder contains a list of leading battery manufacturers who supply this type of post free upon their dry cells.

THE KAYE AND CARTER LUMBER COMPANY, dealers in cedar posts, poles, piling, ties and lumber, announces the removal of its offices to 604 Lumber Exchange, Minneapolis, Minn. All correspondence should be forwarded to the new address.

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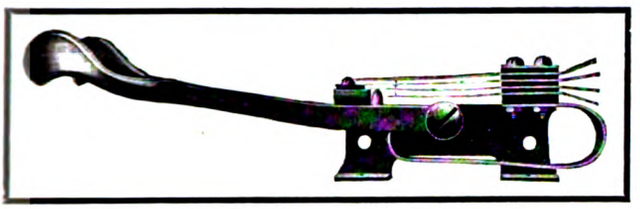
TROUBLE and HOOKS Have always been inseparable



No part of the telephone receives harder usage or more abuse. Long has it been known that SUMTER Hooks were "all right."

And now we offer a new one. Here are some of its features:

1st—Hook lever easily removable without removing escutcheon plate or changing adjustment of contact springs.

2nd—No circuit through hook lever, hook spring, or joint. Hook lever thoroughly insulated, no possibility of receiving a "shock."

3rd—Contact springs are long and flexible and are pointed with genuine platinum. They are held under tension and come to rest on a rubber block; when the receiver is removed from the hook, there is **no lost motion** to overcome.

4th—There is a rubbing contact between the different springs, and the contact points bite into each other.

5th—Every part is die made and interchangeable.

6th—The hook lever is a heavy brass **casting**, graceful in design.

7th—Like all good things this is well finished. **Every** part is heavily nickeled or oxidized, and is made the best we know how to make it, and—**WE KNOW HOW.**

THE SUMTER TELEPHONE MFG. CO. = = SUMTER, S. C., U. S. A.

Patent applied for.

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It never really had a place and has always met with disfavor, because it was always breaking down.

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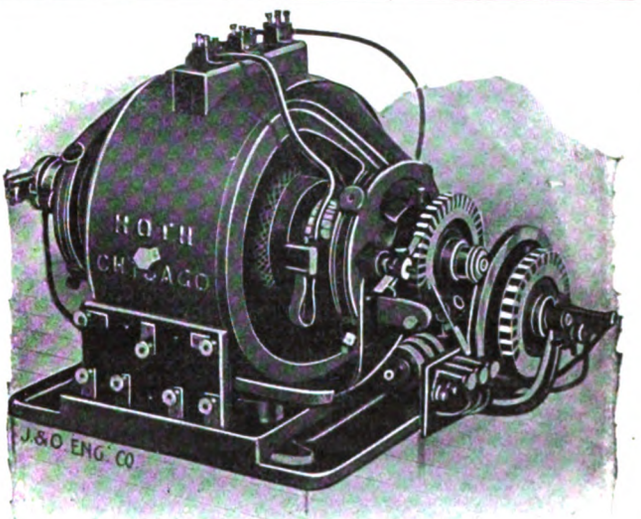

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THE WEEK'S MESSAGES

FINANCIAL.

BELVIDERE, ILL.—Belvidere Telephone Company has declared its quarterly dividend of 2½ per cent.

GAYS, ILL.—The Gays Mutual Telephone Company has increased its capital stock from $5,000 to $10,000. Messrs. Hardinger, Blythe and Treat were appointed as a committee to go to Sullivan to assist in the organization of a mutual company to connect with the Gays Company.

MAROA, ILL.—The Maroa Telephone Company has declared a 7 per cent. dividend.

NEWARK, O.—The Newark Telephone Company has declared a 3 per cent. semi-annual dividend on its preferred stock and a 2 per cent. quarterly dividend on its common stock. The preferred stock has been increased to $50,000. This money will be spent in the improvement of the company's system.

SIDNEY, O.—The Sidney Telephone Company has declared a semi-annual dividend of 2½ per cent. on its common stock.

ZANESVILLE, O.—The Gilbert Telephone Company has increased its capital stock from $200,000 to $700,000.

SALT LAKE CITY, UTAH.—The Utah Independent Telephone Company has declared a quarterly dividend of 1 per cent. The lines of the company are being extended in all directions.

FRANCHISES.

FLUSHING, MICH.—The Shiawassee & Genesee Mutual Telephone Company has been granted a franchise to construct a telephone system in Flushing.

ALBERT LEA, MINN.—The Albert Lea Telephone Company has applied for a franchise to construct a telephone system.

PARK CITY, UTAH.—The Utah Independent Telephone Company has obtained permission to operate in Park City.

CLYDE, WASH.—E. H. Bradbury has been granted a franchise to construct a telephone line between Clyde and Lamar.

COMBINATIONS.

COLUMBUS JUNCTION, IA.—The Columbus Junction Telephone Company has bought the Conesville line.

HORNELLSVILLE, N. Y.—Messrs. Bennett & Johnson, of Hornellsville, representing the Inter Ocean Telephone Company, have purchased the Wayland Independent Telephone Company.

ELECTIONS.

WINNESHIEK, ILL.—The Winneshiek County Co-operative Telephone Company has elected the following officers: President, C. O. Maltby; vice president, E. O. Ellingson; secretary, Frank Morrison; treasurer, J. B. McKay.

HUDSON, IA.—The Hudson Mutual Telephone Company has elected the following officers: President, H. B. Eighmey; vice-president, G. L. Mastain; secretary, B. S. Strayer; general manager, C. A. Hollis.

MILLERSBURG, IND.—The Farmers' Mutual Telephone Company, of Millersburg, has elected the following officers: President, J. J. Zollinger, secretary, Ed. Bartholomew; treasurer, C. E. Freeland.

MT. AUBURN, IA.—The Mt. Auburn Telephone Company has elected the following officers: President, J. M. St. Clare; secretary, C. H. Rawson; treasurer, W. H. Tracy. Directors, H. J. Lamb, Arch St. Clare and George Larmor.

TIPTON, IND.—The Tipton Telephone Company has elected the following officers: S. L. Bunch, president; T. W. Longfellow, vice-president; N. R. Marker, secretary, and W. W. Mount, treasurer.

BAITING HOLLOW, N. Y.—The Baiting Hollow & Roanoke Telephone Company has elected the following officers: President, John C. Young, Roanoke; vice-president, Frank O. Reeve, Roanoke; secretary and treasurer, J. T. Fanning, Aquebogue; general manager, H. H. Talmage, Baiting Hollow; assistant manager, W. R. Fanning, Roanoke. The company recently increased its capital from $20,000 to $50,000, and will spend the money in increasing its lines.

HAMMONDSPORT, N. Y.—The Hammondsport Telephone Company has elected the following officers: J. W. Brundage, president; W. H. Dildine, vice-president; C. H. Bronson, secretary; J. H. Snellie, treasurer.

UTICA, N. Y.—The Utica Home Telephone Company has elected the following officers: E. B. Odell, president; Henry F. Miller, vice-president; Eduard Bushinger, secretary.

ATHENS, O.—The Athens County Home Telephone Company's officers are as follows: W. E. Moler, president; G. W. Duffee, vice-president; W. E. Peters, secretary; A. F. Holmes, treasurer, and C. L. Jones, general manager. It is the intention of the company to extend its system during the coming year.

BEAVER, O.—The Beaver Telephone Company has elected the following officers: John Yoder, treasurer; president, W. H. Ruhlman. The following directors were elected: W. H. Ruhlman, P. W. Sprinkle, N. Wisler, S. J. Heck, E. L. Lonecker, J. Harold, Theo. Obenauf, Robert Hunter and Allen Ferger.

MANSFIELD, O.—The Mansfield Telephone Company has elected the following officers: S. N. Ford, president; J. L. Baxter, vice-president; M. R. Ward, secretary and treasurer; S. E. Ward, manager. A dividend of 2 per cent. was declared.

WARSAW, O.—The Farmers & Merchants Telephone Company has elected the following board of directors for the coming year: J. A. Finly, Joe Finly, J. P. Darling, S. H. Buker, J. L. Beck, W. D. Kissner, J. H. Elder, Wm. Gamertsfelder and S. C. Kissner. The company will build a new exchange at Cooperdale and will spend $15,000 in other improvements.

WAMPUM, PA.—The Snake Run Telephone Company has elected the following officers: President, E. N. Frisbee; secretary and treasurer, C. B. Reno. The company has decided to build additional lines.

YORK, PA.—The York Telephone Company has elected the following officers: President, D. F. Lafean; vice-president, John McCoy; secretary, H. H. Weber; treasurer, C. C. Frick; general manager, G. B. Rudy.

NEW COMPANIES.

CHARLOTTE, ARK.—The Charlotte Telephone Company has been incorporated with a capital stock of $1,500. The officers are: W. P. Jones, president; J. C. McGill, vice-president, and C. K. Hogan, secretary and treasurer. The company will build a line from Charlotte to Batesville and Wade's Camp.

ELKHART, ILL.—The Elkhart Independent Telephone Company has been incorporated with a capital stock of $1,250. Incorporators: G. G. Taylor, A. V. James and J. C. Taylor.

SANGAMON, ILL.—The Sangamon County Telephone Company has been incorporated with a capital stock of $20,000. Incorporators: H. E. Farnham, E. L. Farnham and H. Farnham. President, E. A. Baxter; vice-president, Eli Weber; secretary and treasurer, H. E. Farnham.

SPRING GROVE, ILL.—The Spring Grove Telephone Company, Spring Grove, has been incorporated with a capital stock of $10,000. Incorporators: I. E. Meredith, Anton Schaefer and others.

MACKSVILLE, KAN.—The Macksville & Dillwyn Telephone Company has been incorporated with a capital stock of $1,500.

NEOLA, KAN.—The Neola Mutual Telephone Company has been incorporated with a capital stock of $1,000.

BOLTON, MASS.—The Bolton Telephone Company has been organized with a capital stock of $1,500. President, E. D. Emerson; treasurer, J. Wilkinson Clapp.

CERESCO, MICH.—The South Emmett Telephone Company has been organized with a capital stock of $1,000. The stockholders are John Ulrich, E. T. Eyre, R. M. Gubbins, Jacob Paul and Medeven Getchell.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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All shipments are prompt, subject only to car supply.

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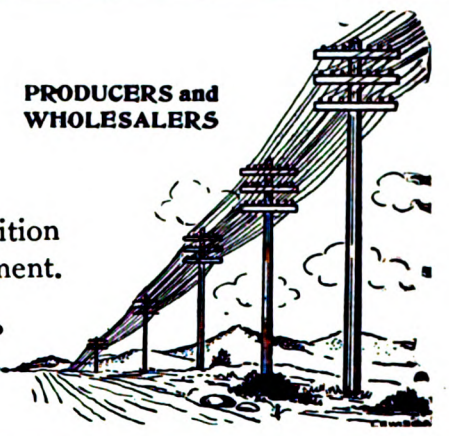

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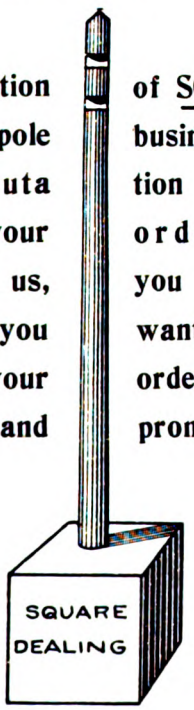

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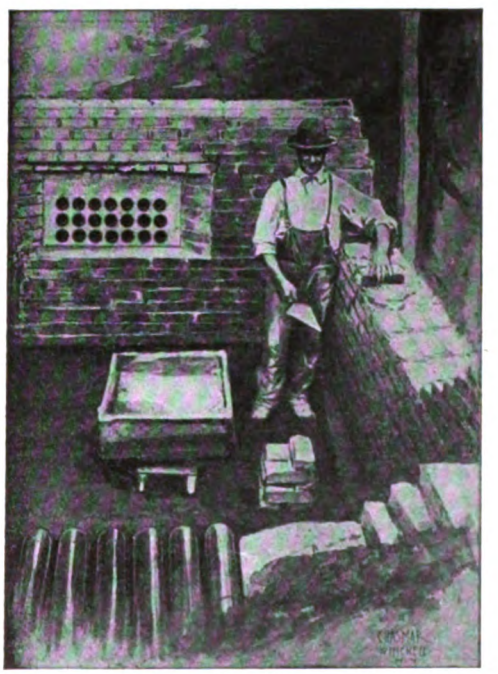

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THE WEEK'S MESSAGES

OAK GROVE, MO.—The Round Prairie Telephone Company has been organized by the farmers in the vicinity of Oak Grove.

MILES CITY, MONT.—Kenneth McLean and H. Gilmore are organizing a telephone company, which is to build a line from Miles City to Shirley.

BEATRICE, NEB.—The New Home Telephone Company has been incorporated with a capital stock of $200,000. The incorporators are F. H. Woods of Lincoln and J. F. Hemenway and J. H. Myers of New York. The company will take over the present Independent company and enlarge and extend its system to many other towns.

STAR, NEB.—The Star Telephone Company has been incorporated with a capital stock of $1,440. W. D. Sherwood is president, and F. R. L. Brust, vice-president.

BREESPORT, N. Y.—The Breesport Telephone Company has been incorporated with the following officers: Charles Kinley, president; G. A. Campbell, vice-president; H. B. Harding, secretary and treasurer; Samuel Campbell, general manager.

HAMMONDSPORT, N. Y.—The Hammondsport Telephone Company has been incorporated with a capital stock of $3,000. Directors: J. W. Scott, H. A. Hoyt, L. D. Masson, Hammondsport.

RUSHFORD, N. Y.—The Rushford Telephone Company has been incorporated with a capital stock of $6,000. Incorporators: J. T. Belanger, V. H. Calhoun and others, of Buffalo.

WATERLOO, N. Y.—The Junius Telephone Company, Waterloo, has been incorporated with a capital stock of $1,000. Incorporators: W. H. Godfrey, H. C. Lundy, Geo. V. Haight, Waterloo.

CASSELTON, N. D.—The Casselton Telephone Company has been incorporated with a capital stock of $20,000. The following officers were elected: President, W. C. Macfadden, Fargo; vice-president, M. M. Meredith, Casselton; secretary and treasurer, C. R. Meredith, Casselton.

COLUMBUS, O.—The Union Telephone Company, with a capital stock of $200,000, was incorporated at Columbus. The new company will run lines to Prospect, La Rue, Green Camp and other places.

JEFFERSON, O.—The Citizens' Telephone Company has been incorporated with a capital stock of $6,000. Incorporators: S. R. Fitch, E. A. Washburn, E. C. Lampson, O. A. Crosby and others.

MILL CITY, KAS.—The Rice Telephone Company has been incorporated with a capital stock of $5,000.

OREGON CITY, ORE.—The Oregon City & Farmers' Independent Telephone Company has been incorporated with a capital stock of $5,000. Incorporators: W. H. Bonney, C. G. Huntley, H. S. Mount and E. G. Caulfield.

BARKEYVILLE, PA.—The Barkeyville Telephone Company has been organized with the following officers: President, G. L. Magee, of Wesley; secretary, B. F. McCurdy of Barkeyville; treasurer, B. F. McKee.

BERNVILLE, PA.—The Bernville Rural Telephone Company has been organized with the following officers: President, Willis L. Bright; secretary, Samuel T. Bordner; treasurer, J. H. Bordner.

PERSONAL.

N. B. ADAMS has been appointed manager of the Christian County Telephone Company at Taylorsville, Ill.

FRANK BANDY, formerly manager of the Hawkeye Telephone Company at Perry, Ia., has been appointed general manager of the Northern Telephone Company, with an office at Storm Lake.

A. M. CALDWELL, formerly manager of the exchange of the Pacific States Telephone Company at Hanford, has been appointed county manager for Fresno County, with headquarters at Fresno.

W. H. LINCOLN of Grand Rapids is to take charge of the exchange of the Michigan State Telephone Company at Menominee.

W. J. McDERMOT has been elected manager of the Clare Telephone Company at Clare, Ia.

J. P. NOBLE, formerly manager for the Sunset Telephone & Telegraph Company at Fresno, Cal., has been promoted to the newly created position of manager for the district comprising Mariposa, Merced, Madera, Fresno, Tulare and Kings counties.

HENRY T. SCOTT has been elected president of the Pacific States Telephone & Telegraph Company.

W. R. WILLIS has been appointed manager of the exchange of the Southwestern Telephone Company at Moody, Tex.

H. H. WITMER, for two years manager of the Lancaster exchange of the Pennsylvania Telephone Company, has been transferred to Scranton.

MISCELLANEOUS.

THOMSON, GA.—The Thomson Telephone Exchange has sold its entire interest to the town of Thomson, and in future the telephone system will be run by the town authorities. Many improvements will be made in the system.

New Construction in the Field

EAGLE, ONT., CAN.—The Wallacetown & Lake Shore Telephone Company contemplates building a line to West Lorne.

LAMAR, COL.—The Springfield-Lamar Telephone Company is to commence the construction of its telephone line.

STEWARDSON, ILL.—The Mutual Telephone Company is to extend its lines to Strasburg and Windsor.

ADVANCE, IND.—The Advance Telephone Company is to build an additional line into Jamestown.

DES MOINES, IA.—The Mutual Telephone Company of Des Moines, contemplates spending about $30,000 in improving its system.

NORTH LIBERTY, IA.—The North Liberty Mutual Telephone Company expects to make a number of improvements and extensions.

CRISFIELD, KAN.—The Barber County Telephone Company, which has completed its line to Crisfield will build a line to Attica.

MILLERSTOWN, KY.—Messrs. Dave Line and Dave Miller have just completed a telephone line from Millerstown to Cub Run, and expect to build a line to Munfordville.

ADA, MINN.—The Ada Telephone Company contemplates the construction of a line to Hendrum.

BROOTEN, MINN.—The Brooten Telephone Company is to extend its lines to North Fork, Raymond, Sedan, Terrace, Gilchrist, Lake Johanna and Simon Lake.

HOMER, MINN.—The Homer Rural Telephone Company is to make many extensions to its lines in the spring.

WELLS, MINN.—George Hawkins is the prime mover in the organization that is to build a line from Wells into Waseca County.

WINONA, MINN.—The Winona Telephone Company is planning many improvements and extensions for the coming year.

RALEIGH, MISS.—The Smith County Telephone Company is to build a line from Raleigh to Sylvarenam, also one from Taylorsville to Laurel.

GARRISON, N. D.—Garrison is to have a telephone system in connection with Hughes' Electric Company's long distance plant.

WARREN, N. H.—The Baker's River Telephone Company is to spend about $3,500 in extending its system.

LUNA, N. M.—The Luna County Telephone Company is to construct a line to Mimbres Hot Springs, Luna County, via Faywood Hot Springs.

KIRKVILLE, N. Y.—The Independent Telephone Company is preparing to construct a telephone system in Kirkville.

MACDOUGALL, N. Y.—The MacDougall Telephone Company is to build a line from Ovid to Lodi.

MIDDLETOWN, N. Y.—The Middletown Telephone Company is about to make connections between Middletown and Goshen.

OLCOTT, N. Y.—The Lakeside Telephone Company is to install an exchange at Newfane.

ONTARIO, N. Y.—The Ontario Telephone Company is to extend its lines both in the city and in the county.

PT. DICKINSON, N. Y.—The Independent Telephone Company is building a line from Chenango Bridge to Pt. Dickinson.

CRESTLINE, O.—The Crestline Local Telephone Company is to greatly improve its system this year.

JOHNSTOWN, PA.—The Johnstown Telephone Company is to spend $100,000 in improving its system.

OBERLIN, O.—The Oberlin Telephone Company will spend $10,000 in improving its system.

MEADVILLE, PA.—The Meadville Telephone Company is building a line from Conneaut Lake through Geneva to Custards.

KINGWOOD, W. VA.—The West Virginia & Western Telephone Company, whose line between Kingwood and Trowbridge's Ferry has been completed, will shortly have an exchange at Tunnelton and Terra Alta.

MILTON, WIS.—The Milton & Milton Junction Telephone Company will build its lines east of the town, also into the Burdick district.

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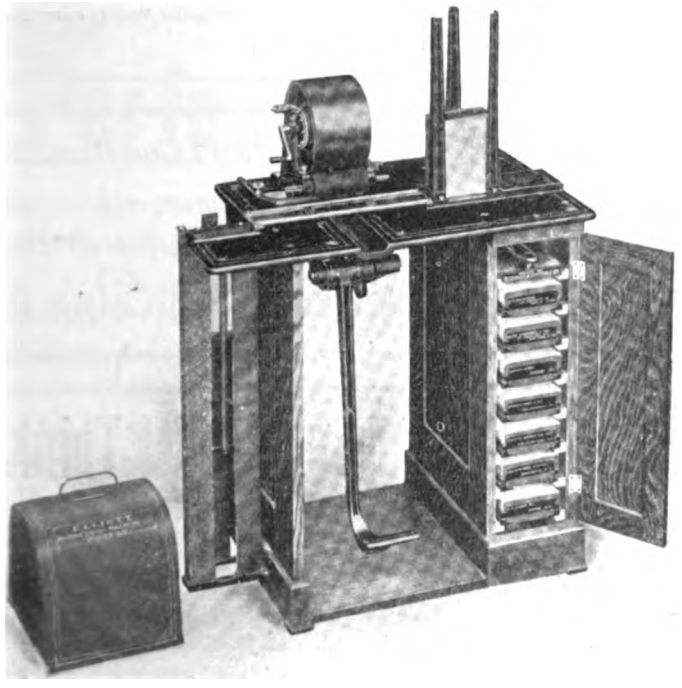

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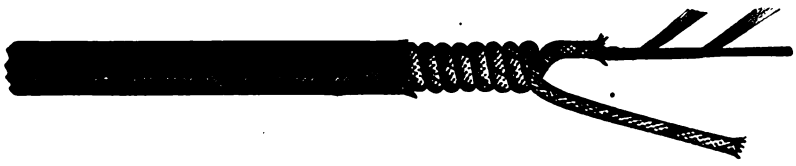
THE CORD THAT LASTS.



This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

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"NORTH'S" Solid Back Transmitter that combines ample volume, perfect articulation, deep penetration and natural pitch.

"NORTH'S" Permanently Adjusted Receiver. The diaphragm does not rest on the outside shell, but on a bell-shaped metal seat—it isn't thrown out of adjustment by unequal expansion of hard rubber and magnet metal.

"NORTH'S" New Ringer, provided with a knife-edge, weighing-scale bearing armature—it can't tighten or drop out of place.

"NORTH'S" Horizontal Lever Adjustable Tension Switchhook with long flexible contact springs—they can't break or become misplaced, and always resume their normal positions.

The parts are individually tested—the transmitter by an engineer. There are two inspections during assembling, a final test on completion and again a test before shipping—just to make sure.

THE NORTH ELECTRIC CO.,

CHICAGO CLEVELAND DALLAS

OF INTEREST TO YOU

"STANDARD" TYPE XX

If you are in any way connected with, or interested in, the purchasing end of a telephone system, this will be of interest to you.

We manufacture and sell direct, the most practical and improved telephone condensers on the market—

Andrae Condensers

They come in three distinct styles—two illustrated herewith—and each style is fully guaranteed.

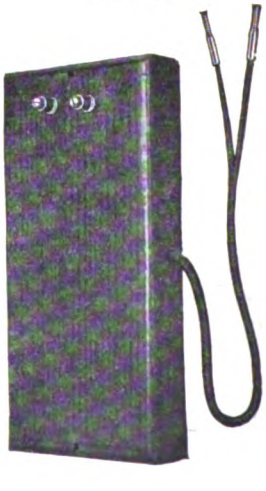
To convince you of the reliability and worth of these instruments and to show the utter confidence we place in their ability to "make good," we will equip an entire line on trial and pay return charges if not found satisfactory.

Could we offer you a more liberal proposition?

"ANDRAE TELEPHONES NEVER DISAPPOINT"

Our catalog can be had for a postal. Why not send for it TO-DAY?

No. 186



JULIUS ANDRAE & SONS COMPANY, 99 WEST WATER STREET MILWAUKEE, WIS.

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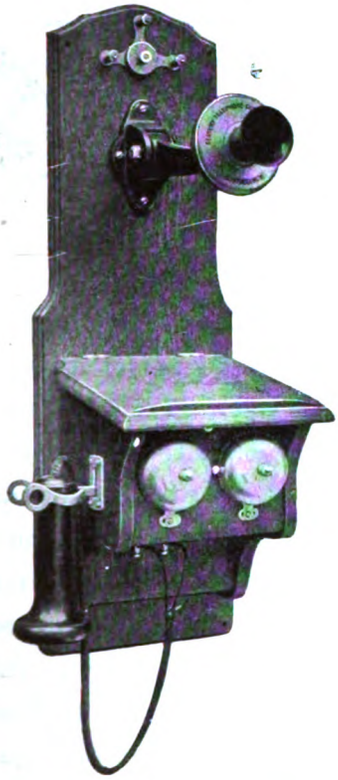
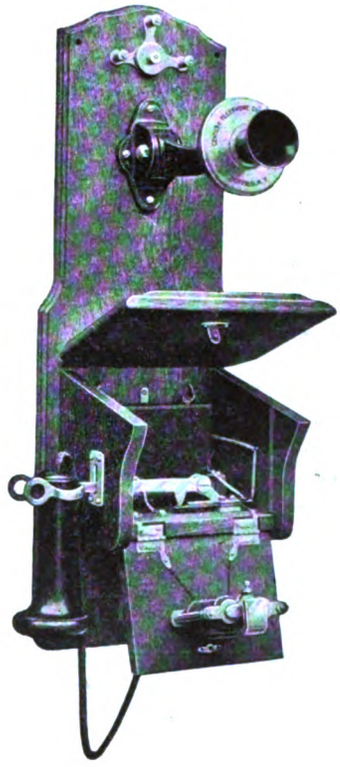
CENTURY

100 % GOOD

IN COMMON BATTERY TELEPHONE SERVICE





it is absolutely necessary that the telephones are perfect, electrically and mechanically.

We manufacture wall and desk telephones for this class of service. During the past five years these telephones have proven to be the most efficient and reliable made.

Our No. 70 wall telephone is so constructed that all parts are easily accessible.

The cabinet, made of quartered oak, is small and well proportioned.

The telephone is equipped with our No. 5 Platinum Electrode Transmitter and No. 11 Perfection Receiver.

A trial of this instrument will convince you of its efficiency and reliability, and if interested we will be pleased to send you one or two of these instruments on 60 days' trial, charges prepaid.

CENTURY TELEPHONE CONSTRUCTION CO.

332 ELLICOTT STREET

BUFFALO, N.Y.

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We are Makers of Telephones

SPECIAL INDUCEMENT FOR 30 DAYS

We will send you 10 Bridging Telephones, **our best 5 Bar Generators, 1600 Ohm Ringer Coils, Solid Back Transmitter, complete for $105.00** on 30 Days' Trial.

If not satisfactory, return to us at **our expense.**

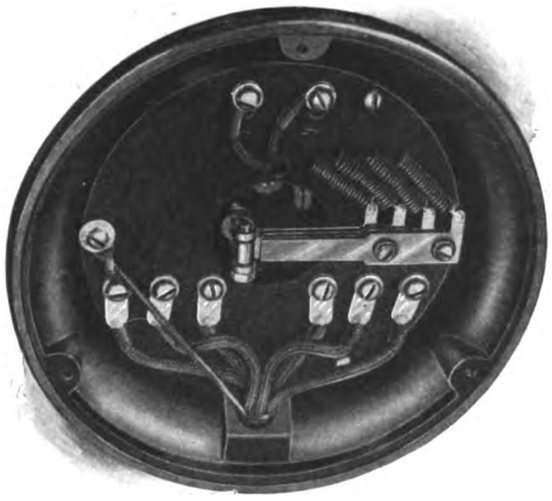
1000 TELEPHONES ON HAND Orders Filled and Shipped Same Day Received.

FARR TELEPHONE & CONSTRUCTION SUPPLY CO.

118-120 W. JACKSON BOULEVARD, CHICAGO, ILL.

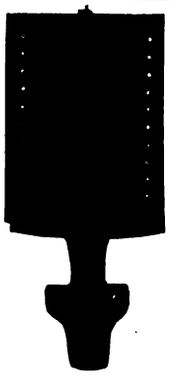
MONARCH APPARATUS

THE DESK SET



All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 10-16 SOUTH CLINTON STREET CHICAGO, ILL.



SIDE BRACKET.

Patented

TYPE A—10-Pair Hall Cable Box.

CABLE TERMINAL EFFICIENCY.

A great deal of the efficiency of a cable plant depends upon the terminal and distribution facilities. And what is more, the type of terminal is of the greatest importance. Some of the points to be considered in its selection are protection, "getatability," compactness, rigidity. Considering these features collectively or individually you cannot find a terminal on the market that is superior to the HALL. Protection was given the greatest attention in its design so that when you buy a

HALL CABLE TERMINAL

you have bought protection against lightning, sneak currents, or crosses with dangerous circuits. The "getatability" of the Hall is unique. When the cover is taken off the top, bottom, front and back are exposed. No opportunity here for faulty inspection.

Compactness? Just look at the illustration. That tells its own story.

Rigidity? An all-metal framework carries the terminal plate. We couldn't make it stronger if we tried.

Seems to us you ought to get prices. Your name and address will bring them, and some more facts that will be of value to you.

THE MOUNTAIN STATE ELECTRICAL COMPANY,

Sole Manufacturers, WHEELING, WEST VIRGINIA.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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DEAN TELEPHONE APPARATUS

"There Must Be a Reason."

LONGEVITY

We claim extremely long life for our telephone product—an efficient and active life.

Our equipment is entirely new, not a re-hash of old apparatus (so called "new models") and each design has been carefully proven out in practice by the largest and most conservative buyers.

The materials used are those which have stood the test of many years in telephone apparatus construction—the best to be had for each individual purpose. We know these materials and their proper uses (one of our most valuable assets), hence we know that our apparatus will enjoy an unlimited life—the longevity that is an enemy to maintenance expense.

This is another reason why our product will help to pay your dividends. Incidentally, a reason for the unprecedented growth of our business.

It will pay you to try the celebrated Dean product in your new year's construction.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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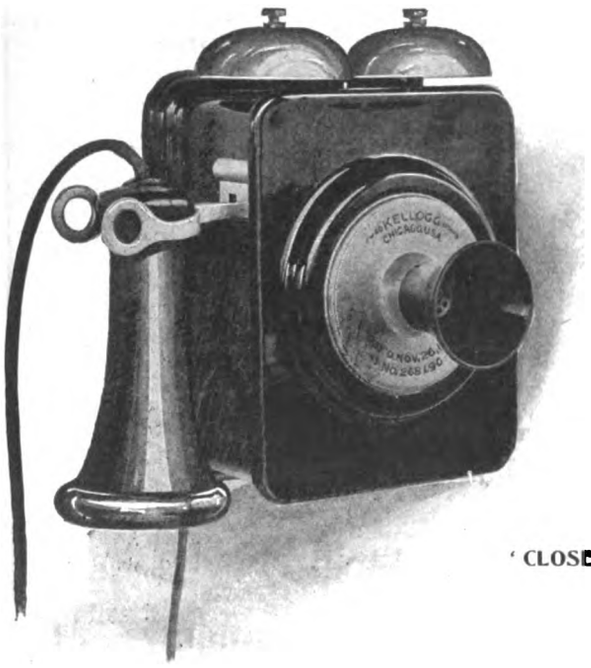
KELLOGG PHILOSOPHY THE BEST IS THE CHEAPEST

KELLOGG

STEEL BOX TELEPHONES
FOR
HOTELS AND RESIDENCES
ESPECIALLY ADAPTED TO
KELLOGG 4-PARTY HARMONIC SYSTEM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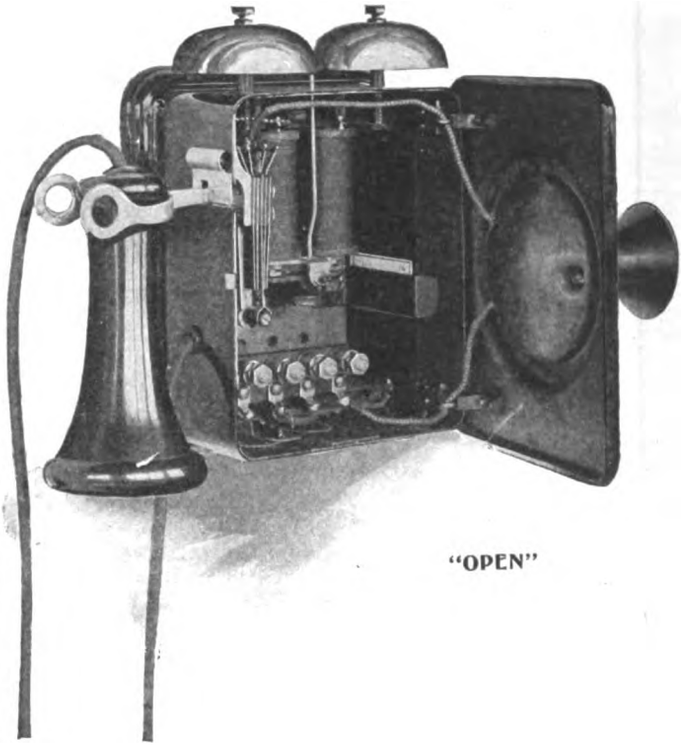
"OPEN"

ADVANTAGES

They will NOT warp, crack or fall to pieces.
HEAT or MOISTURE will not affect them.
They can be enameled in any desired color—standard being black.
All binding posts and connections are CONCEALED.
They are the most COMPACT TELEPHONE made.
DURABILITY, HIGH EFFICIENCY, UNIFORMITY, MODERATELY PRICED.

Send for the "LITTLE RED BOOK" which tells you all about them.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
Congress and Green Sts., Chicago, Ill.

BRANCHES

NEW YORK, N. Y. 116 Nassau St.
PHILADELPHIA, PA. Keystone Tel. Bldg.
CLEVELAND, O. Electric Bldg.
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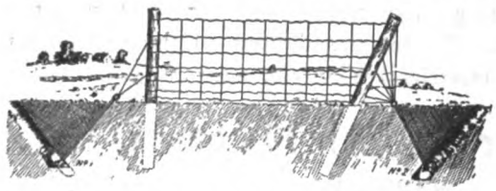
"Hercules" Anchors

MADE OF MALLEABLE IRON



"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

"HERCULES" Anchors will not creep.

Send for Prices and Circulars

The W. G. Nagel Electric Co.

28-32 ST. CLAIR ST. TOLEDO, O.

The "Norton" Specialties for Telephone Line Construction

Patent Combination Messenger Hanger

For 9-32 to 1-2 inch strand.

For Straight Lines and Corners.

SOLID FORGED STEEL

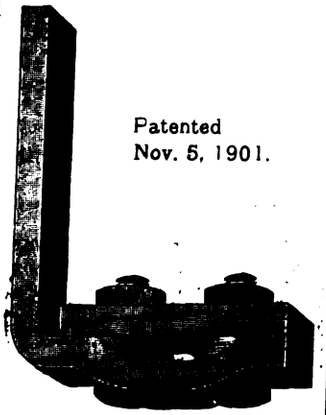
Japanned or Galvanized.

No. 1 Light. . . . . $1\frac{1}{2} \times \frac{1}{2}$

No. 2 Medium. . . . . $1\frac{3}{4} \times \frac{1}{2}$

No. 3 Heavy. . . . . $2 \times \frac{1}{2}$

Always in Stock.

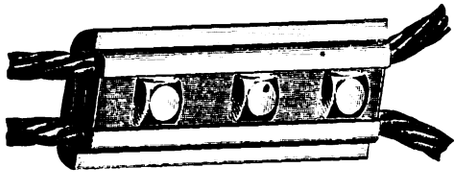


Patented Nov. 5, 1901.

Do not risk the lives of your men or the life of your work by using cheap hangers.

Solid Forged Steel D Three-Bolt Clamps

Strongest and Best.



Require no Clips.

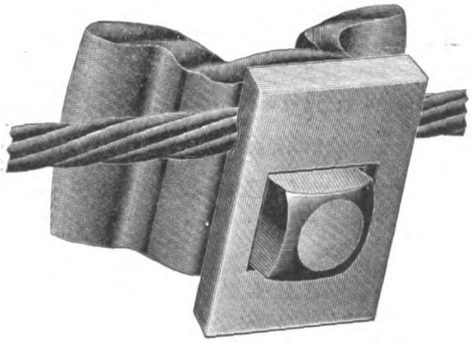
Most Economical.

Never Break.

Never Slip.

For low price and great strength

The Little Giant beats them all



THE NORTON TOOL COMPANY

ELECTRICAL DEPARTMENT

Write for Catalogue and Net Prices

WEST PARK, OHIO

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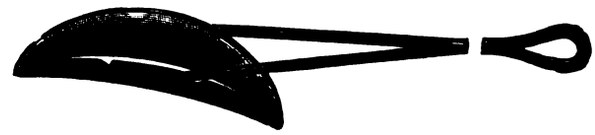
BE AS HONEST

with yourself as we are in the manufacture of *International* Apparatus. Give us the opportunity of estimating on your next order for telephones or switchboards. Recent installations in the U. S. and Foreign Countries are convincing.

International Telephone Mfg. Co.
HARRISON AND CLINTON STS.
CHICAGO, ILL.

"They Never Pull Up"
THE MILLER ANCHOR CO.
Norwalk, Ohio, U. S. A.



Elmer P. Morris Co.
51 DEY STREET - NEW YORK
Eastern and Export Agents

2
2
5

You Don't Figure Right

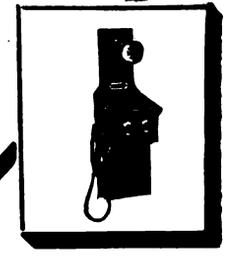
UNLESS you get our prices on your construction materials. We carry the largest stock and do not make a side line of the telephone business. We do not sell street railway or electric light materials. All our time and capital are devoted to securing for YOU the best in OUR line. We cannot always quote every item LOWER than others, but we will not allow any legitimate competitor to undersell US; on many items WE ARE lower. And, on a complete installation, there will be a surprise to you at the net saving. A two-cent stamp will prove the truth of our claims now.

Central Telephone & Electric Co.

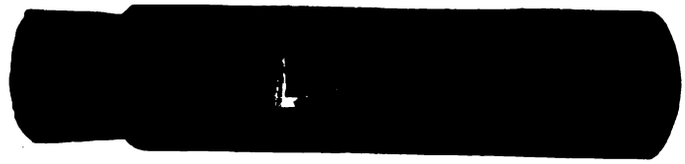
Makers of High Grade Telephones

2133 LUCAS AVENUE
ST. LOUIS

Dealers in Every Telephone Supply



Insulated Electrical Wires and Cables



Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.
TRENTON, N. J.

Agencies and Branches

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SAN FRANCISCO
CHICAGO
PHILADELPHIA
CLEVELAND
ATLANTA

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The Public Makes Your Record

LET THEM MAKE IT POSITIVE

The BAIRD Pay-station has a lever by which the Public tells the operator

WHAT COIN IS DEPOSITED

Without the LEVER the signal is Weak and UNCERTAIN.

With it it is CLEAR.

BAIRD MFG CO., 6 Michigan St., CHICAGO

SIMPLICITY

is the Keynote of Success

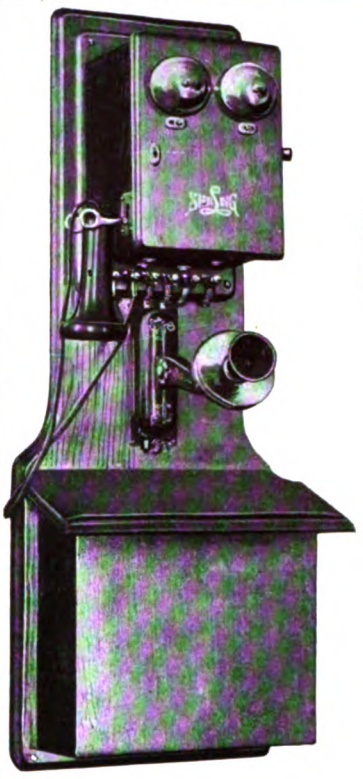
A simple device which accomplishes the same results as a more complex one is certainly more preferable. The Sandwich Pole-Changer is the simplest device ever constructed for ringing purposes. There are but three contact springs and as these engage alternately with their opposite sides they cannot be forced out of position by constant use.

It requires no adjustment, as this is done at the factory and is permanent.

The use of a primary constant current battery to operate the vibrator has been dispensed with; a minute quantity of current, hardly a milliampere, being taken from the ringing battery, through suitable resistance coils for this purpose.

It will work in either a vertical or horizontal position, which permits it being hung on a wall or mounted on a cabinet. Another excellent feature is that it is practically noiseless. There are others which are described in our free booklet. Let us send it to you.

THE SANDWICH POLE-CHANGER CO.
400 EDDY STREET, SANDWICH, ILL.



No. 5

STERLING ELECTRIC COMPANY

LAFAYETTE, INDIANA

No. 8

No. 18

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Evidence to Prove All Our Claims

for the Generator Call Visual Signal Switchboard, we have been telling you about the last few weeks.

CITIZENS' TELEPHONE COMPANY OF LAWRENCE CO.

LAWRENCEVILLE, ILL., 9-17-'05.

Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.

Gentlemen: Replying to your favor of the 16th inst., I am pleased to advise that the Visual Signal Switchboard purchased from your company, a little over a year ago, for our Summer exchange is giving perfect satisfaction. In view of the almost extravagant claims you made for it, I expected to be disappointed in some of the particulars, but the only disappointment met with so far is that the board has fulfilled every promise you made for it.

Wishing you much success, I am,

Yours very truly,

G. H. CUNNINGHAM, Mgr.

What better evidence do you want that this is the switchboard for you to buy, than facts of this kind from the user? If you could have an opportunity to see one of these boards operate, you wouldn't want any other evidence to prove its high quality. There are a good many of them in use. Maybe there is one in your territory to which we can refer you.

Let us mail a copy of our bulletin and quote you prices. Remember we have standard cabinets of 60, 70, 100, 140, 180 and 200 lines.

Stromberg-Carlson Telephone Mfg. Company

GENERAL OFFICE
ROCHESTER, N. Y.

BRANCH SALES OFFICE
CHICAGO, ILL.

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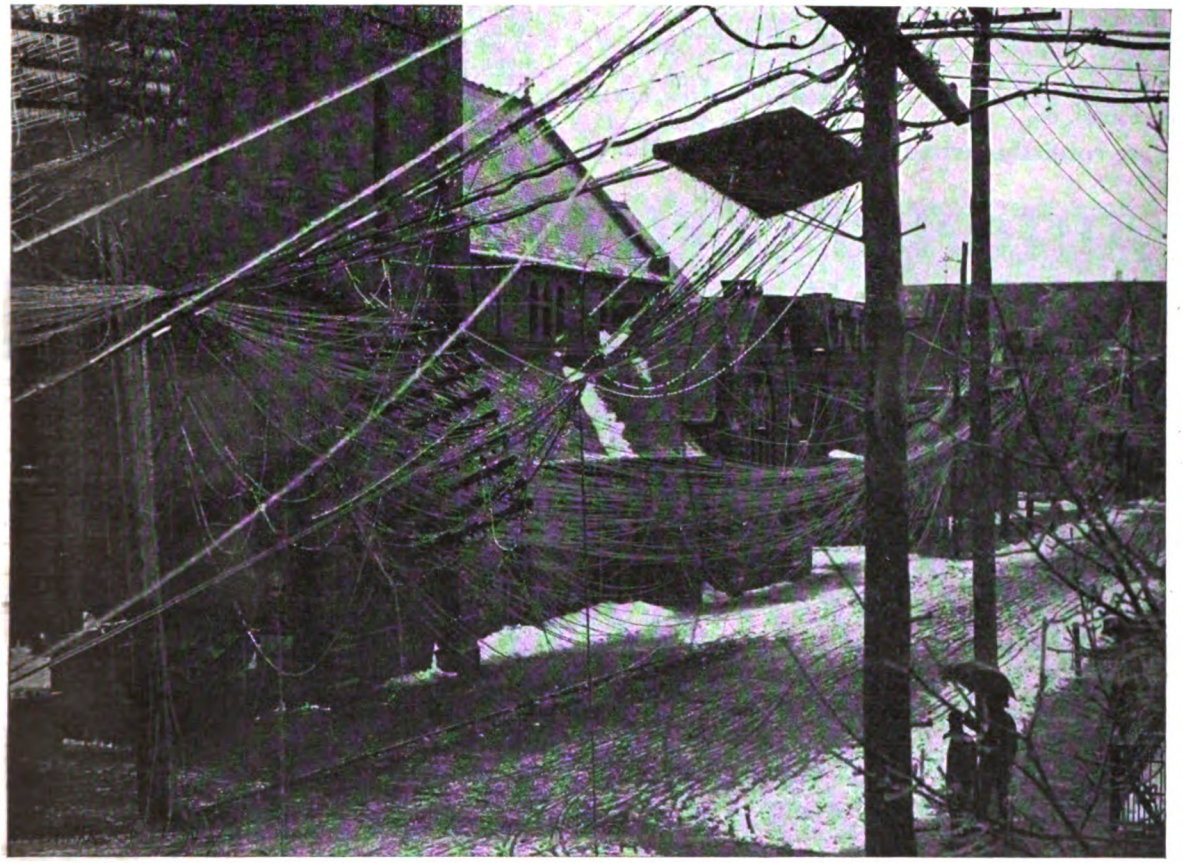
WE MAKE CABLE

No. 3—Mental Damage

You probably know what it is to have a lot of wires down after a storm. You also know the demoralizing effect it has upon your organization. Line signals burning continuously or drops falling every minute. Parties out of service calling up and overloading your chief operators. Everyone is working under an extraordinary mental strain, and as a result the rest of the business suffers.

Operators and other employees who are normally calm and collected lose their heads and address the subscribers in a curt and unreasonable way. The result is your patrons become angry and it requires lots of tact and time to overcome their anger.



Every such occurrence as this causes a loss of confidence which is very difficult to regain and which lessens the number of your subscribers.

Comparisons are generally odious and when one man, who has experienced the loss of service due to the breaking of wires, talks it over with a man in a town where cable is used, the chances are your company is not complimented. Do not put off the change, for the time may come when you will regret the delay.

Write for our booklet about cable, and then let us estimate.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N.Y. CHICAGO, ILL.

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NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.	SOUTH BEND, IND.	ALBUQUERQUE, N. M.	WESTERLY, R. I.
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LINCOLN, NEB.	PORTLAND, ORE.	NEW BEDFORD, MASS.	ALLENTOWN, PA.
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SIOUX CITY, IOWA.	PENTWATER, MICH.	HAZLETON, PA.	HAVANA, CUBA.
CLEBURNE, TEXAS.	TORONTO JUNCTION, CANADA.	WOODSTOCK, N. B.	MARIANAO, CUBA.
COLUMBUS, GA.	WILMINGTON, DEL.	ST. MARYS, OHIO.	BERLIN, GERMANY.

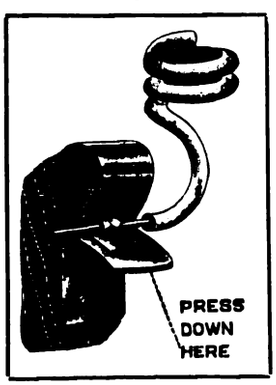
You are cordially invited to visit our booth, No. 20, Section C, at the Electrical Show, Chicago Coliseum, January 15-27.

AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

EXPERIENCE

We all learn by experience. If you are a user of dry batteries you must have learned from past experience that the screw and nut binding post is not entirely satisfactory for this class of work.



You know how it works loose at the most inopportune times.

You know that if the nut is set down sufficiently hard to hold the wire firmly that it is very liable to injure or weaken the wire and increase the possibility of its being broken off.

You know that it is the small troubles that eat into your profits, cause hard feelings amongst your subscribers and as well account for a large part of the inspector's time.

If you admit that this is true, then why not profit by your experience and specify

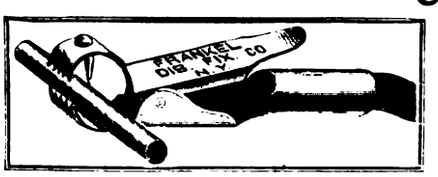
FAHNESTOCK SPRING BINDING POST

when next you order? It will not add a cent to the cost of your cells, and it will save you a lot in the long run. Give it a trial on your next order. Sample free.

FAHNESTOCK ELECTRIC CO., 132 Havemeyer St. BROOKLYN, N. Y.

SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.

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GET out of that rut of skinning the wires—IT'S EXPENSIVE.
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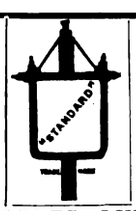
FROM YOUR SUPPLY HOUSE, OR

FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

Telephone Wire  **and Cables**

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Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. ST. LOUIS. SAN FRANCISCO.

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The New Long-Distance Board at Toledo

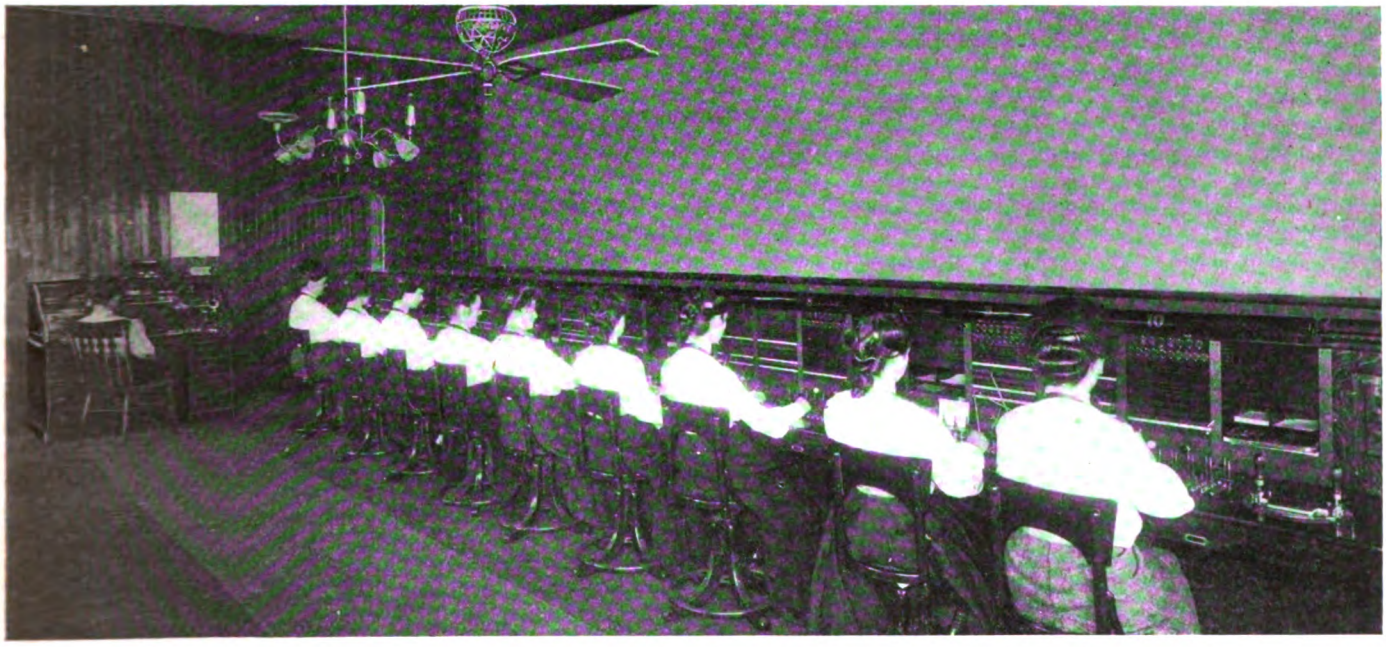
By Marshall S. Thompson.

THE new exchange of the United States Telephone Company, in Toledo, Ohio, which has been in operation since May, 1905, is a conspicuous example of the high state of perfection which has been attained in the installation of equipment of the most efficient type, and in a system of operation which conforms to the most advanced standards for the handling of long distance business. The toll board consists of five two-position sections. The framework of the switchboard is wood and steel in two-position units, five sections forming a continuous board with a five-panel jack multiple. All cables and wires in connection with the board enter it aerially at the top of the terminal section at the left-hand end. Suitable pins and racks are supplied for taking the cable from section to section. Steel brackets are provided for supporting the cables on a level with the apparatus to which they are connected, and the uprights of this framework are so placed that the multiple cables may be connected to the jacks outside of the board and then readily installed.

A cable board is provided near the floor in the back of the section upon which run the battery and ringing leads. The jacks, lamp sockets, keys, etc., are so mounted and arranged that equipment can be installed at any point in the five panels and readily raised or lowered. The strips of jacks are one-half inch thick. All other apparatus mounted in the jack panels is the same thickness or a multiple thereof. Relays and other apparatus which it is necessary to locate on the framework are all in accessible positions. Exposed cabinet work, including cable boxing in the exchange room is quartered oak, dead finish, fitted on the steel framework. The rear of the board is enclosed with hardwood doors, with an imitation oak finish, so arranged that they may be readily removed. Keyboards are built up of five layers of oak, the grain in alternate layers running in different directions to prevent warping. They are separately hinged and locked and arranged to provide for easy access to the keys and wiring. Plug shelves are of oak, covered with *leather*, natural finish, close up to the hinges. Calculagraphs are installed between the two adjoining operators of each section.

The individual pieces of apparatus used are of the standard types. Jacks are provided with German silver springs and pure platinum contacts, mounted in blocks of hard rubber. The lamps used as supervisory signals and calling-in signals have an illuminating value of one-third candle power and operate off a battery of 30 volts. The lamps used for busy signals are designed to reach their full illumination on a 40-volt circuit. They are used on a 30-volt circuit, and glow with a brilliancy less than that of the line signals, this being standard practice for this class of signals.

Lamp sockets installed in the jack panels are mounted in strips of ten or twenty to correspond with the strips of jacks with which they are associated. The lamp sockets for use in connection with the supervisory lamps in the cord circuits are mounted singly, as also are the lamp sockets used in connection with the pilot lamps. Lamp caps for supervisory and calling-in lamps are white and are protected from breakage by open work metal caps. The lamp caps of the busy lamps associated with the toll line and office trunk multiples are red. Lamp caps used for the pilot lamps that are wired in connection with the calling-in lamps at the different positions are white. All cords are of sufficient length to reach every jack in the entire section when the ultimate number of lines is installed. The keys are all of approved design, fitted with the best grade of German silver springs mounted on rigid metal frames insulated with the best quality of hard rubber. Contacts are of pure platinum. The keys mounted in the jack panels are known as the locking plunger type, mounted on the same size stripe and same spacing as the jacks with which they are associated. Relays have German silver springs with pure



The New Toll Board in the Office of the United States Telephone Company at Toledo, Ohio.

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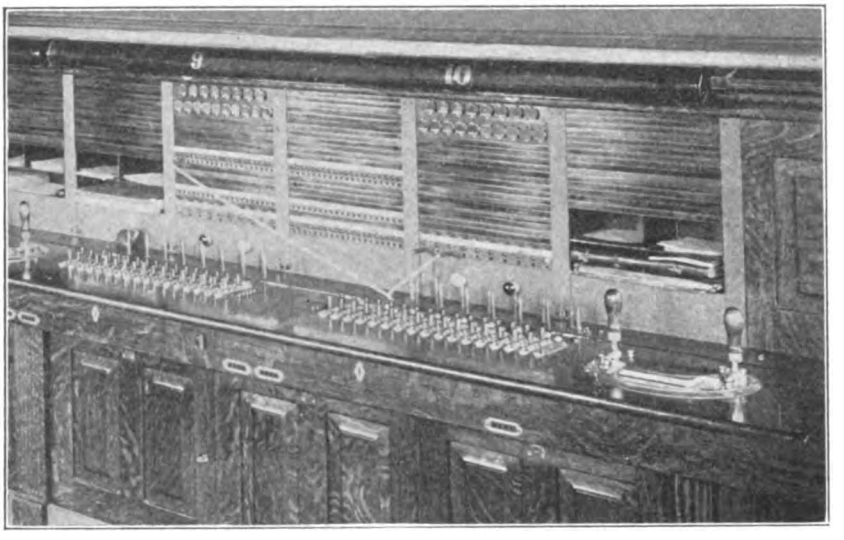
platinum contacts, and are mounted on steel mounting strips and covered with dustproof cases. They are easily accessible and removable from the strips. The windings are of silk insulated copper wire. Supervisory relays in connection with the cords are mounted on strips in the back of the boards. Line relays and cut-off relays are mounted on the relay rack. Transmitters used on the toll board are of the breast plate type. They are constructed principally of aluminum and weigh only 6.8 ounces. All switchboard wire and cable used in connection with this board is made of annealed copper wire with a tinned surface. Each wire is insulated with one wrapping of silk and two of cotton. All talking circuits in the toll board are strictly metallic twisted pairs, and so arranged as to prevent any cross talk or other inductive disturbances. Each operator's position is numbered with a gilt figure placed on the electric lighting reflector. On account of the low height of the key shelves no foot rail is necessary. A strip of rubber is, however, placed along the bottom of the front panels for protection. The front of the toll board is lighted with 110-volt 4 C. P. incandescent lamps, over which is a reflector of the trough style.



End Section of Toledo Toll Board, Showing Arrangement of Apparatus.

The relay rack is constructed of structural angle iron and braced so that it is perfectly rigid. It is designed for mounting strips of relays of the standard width, two inches, or strips of other apparatus the same dimensions or a multiple thereof. The iron work was given two coats of black paint, dull finish. The relay rack has a capacity of 48 strips of ten relays each.

The distributing frame is also constructed for structural angle iron for mounting the necessary terminals for connecting cable from the different pieces of apparatus. Suitable racks and holders are provided for placing and removing the jumper wires. The rings through which the jumper wires pass are enameled. The terminal clips are mounted in hard rubber and well tinned for soldering. The holes through which the jumper wires run in the wooden blocks upon which the terminal clips are mounted are large enough to take six single No. 20 B. and S. gauge jumper wires. The frame is so constructed that the terminal blocks in units of 20 can be added at any time. The iron work of this rack is also given two coats of black paint. The distributing frame has a capacity for 800 pair of triple terminals on each side, and the present equipment of the terminals comprises 19 blocks of 20 triple terminals each and 22 blocks of 20 pairs.

The fuse board is made of a single slab of clear slate of the best quality and provided with suitable bus bars and terminals mounted on an iron frame designed for fastening upon the wall. All wiring is brought to the back of the board. The board has a capacity for 30 pairs of transmitter leads arranged for one ampere fuses, and 30 battery supply taps for 1 to 5 ampere fuses. The equipment was furnished by the Stromberg-Carlson Telephone Manufacturing Company.

The present layout of the positions, showing the class of work handled on each is as follows: Position No. 1, information; position No. 2, line; position No. 3, line; position No. 4, line; position No. 5, recording; position No. 6, recording; positions Nos. 7, 8, 9 and 10, line. In addition to these there is provided one supervisor's wall set. The board is equipped for 40 outgoing trunks, 40 toll lines, 20 recording trunks and 20 office trunks. The information position is equipped with toll line multiple, service trunk multiple and five ring down trunks multiplied throughout the board. The duty of the operator at this position is to relieve the line operators of all unnecessary work outside of the handling of straight business, thereby increasing the efficiency of the service as rendered by the line position operator. It has been found desirable to refer to this operator all incoming calls on which the line operators receive the report "don't answer" or "out of order" for her verification from the local company. She also takes up for future action all calls upon which the line operator has made at least three unsuccessful attempts to reach a busy telephone. The information operator also has referred to her all questions from the public relating to service, charges on messages, rates, etc. All messengers are sent by the operator at this position. Copies of the latest issue of both local telephone and city directories are kept before her and trouble in locating a party is referred to the operator. Also, a list of daily changes and entries in the local telephone directory is recorded at this position.

Positions No. 5 and No. 6 are used solely for recording, and as a common drop board when only the night operator is on duty, thereby making it possible for her to handle all the business from one position. This section is equipped with 20 recording trunks. These are multiplied before each "A" operator at the local office and the subscriber calling for "long distance" is directly placed on one of the above trunks and answered immediately by the recording operator, who records the call upon a toll ticket in the regular manner, advising the subscriber that he will be called as soon as his party is secured. The ticket is then passed to the proper line position. In addition to the necessary information for securing the party desired the recording operator always places on the ticket her personal number and the time the call is received from the subscriber. The present recording trunks are multipled at each recording position, making it an easy matter to answer signals upon these lines from other positions. This is a material aid in giving very prompt service to the subscriber. The recording operators also have access to toll line multiples, service trunk multiples, chief operator, information operator, supervisor, wire chief and other long distance terminals.

At the remaining positions occupied by regular line operators each operator has before her a multiple of the toll lines, service trunks, inter position trunks, and five answering jacks for toll lines terminating at her position. At present the United States Telephone Company is operating out of Toledo thirty toll lines, averaging about four lines per position. Those positions having more than this number handle local short haul toll lines. These lines are grouped and classified at each section as nearly as possible in accordance with the direction they take, thereby concentrating the business going in a certain direction at the same position. This gives the operator the advantage of having all calls originating in that particular part of the territory handled at her section, greatly increasing the efficiency of the service. Before the installation of the new equipment at Toledo the line positions were averaging about 173 tickets per position per day. The average now is 144 tickets per position. In addition to the load the line positions are carrying, records are being secured at various times showing the number of calls, good and lost, handled per day on each circuit. Upon these records is based the traffic manager's recommendation for additional circuit facilities.

The method of handling calls conforms to the following routine:

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The recording operator upon taking the call from the subscriber immediately releases his line and it is not taken up again until the line operator is ready to establish the connection or give the subscriber a definite report on his call. It has been thought advisable at certain offices where the line operator expects to complete her call within a five-minute period to pick up the subscriber's line immediately upon her receiving the ticket, but owing to the small percentage of busy reports at the Toledo office, this has not been done, as it places more or less of a hardship on the subscriber by having his line out of service during these periods. The holding of toll circuits by operators is one of the greatest evils a long distance company has to contend with to-day, and until this is eliminated to a much greater extent there will always be a congested condition of circuits, and all offices will suffer accordingly. In this office the line operator does not hold the toll circuit to the distant office unless requested to do so by the distant operator, and in case the circuit is built up through one or more offices the line under no circumstances is to be held for a longer period than five minutes. The line operator reports immediately to the subscriber upon receiving a definite report relative to his call, and such additional reports as may necessary, but care is taken that the subscriber is not called to his telephone from time to time only to receive indefinite reports, such as busy, etc.

In the case of inquiries relating to calls upon which a ticket has been made the recorder upon answering the signal from the subscriber, and finding that it is some one desiring information relative to a call which has previously been given, replies by saying: "I will give you the operator handling your call," and immediately connects the subscriber by means of an inter-position trunk to the position at which that call is being handled. This signal is always answered by the line operator saying: "This is operator number ——," giving the number of her line position, and she then proceeds to give the subscriber the desired information. In connection with this the importance of answering this signal promptly should always be impressed upon the mind of the line operator, as it represents a subscriber desiring information relative to his call, and speed is essential. The line operators refer to the supervisor all calls on which there has been a delay of twenty minutes and on which no definite report has been received from the distant office. The line operators are instructed to be careful to make notation on the back of a ticket relative to any interruption a subscriber may experience with the service.

The operators at the switchboard are under the control of a chief operator, who is directly responsible to the manager or superintendent for the work as carried on in the operating room. All persons employed in the operating room report to the chief operator, either directly or through the supervisor. Her duties consist in seeing that the work is properly distributed among the various positions, and that uniform service is being given with the greatest efficiency. Also, that her subordinates, such as supervisors, information operators, messengers, etc., are performing their duties properly. In addition to this she sees that all trouble, such as switchboard trouble, line trouble, etc., is reported promptly and remedied by those having that work in charge. The chief operator is also responsible for each day's business as sent to the billing department, and sees that all information on tickets, such as charges, elapsed time, and names are correct before they leave her department. All complaints from subscribers relative to the service are referred to her by the supervisors and operators for adjustment.

The supervisor is responsible for the work as carried on by the operators in her division. Eight positions or four sections are considered a sufficient number for one supervisor to have charge of. The supervisor having charge of a division is expected to constantly patrol that part of the board to see that all signals are answered properly and promptly, and that no unnecessary delay takes place on tickets at those positions, and to take up with supervisors at other offices such delayed calls as may come to their attention. All serious complaints, and matters which they are not able to handle are referred by supervisors to the chief operator for adjustment.

All service is graded and shown on the back of the ticket by numerals and letters, the numerals representing different degrees of service such as those due to the quality of transmission, interruptions, etc., while the letters signify the amount of monitoring the connection had. The different grades of service are as follows:

1. Very good, perfectly commercial. No interruptions from any source.

2. Good. May include slight, occasional or momentary interruptions. Commercial.

3. Fair. Difficulty in hearing, repeating, some line trouble and cut-offs. Commercial, overtime generally involved.

4. Poor and uncommercial. Repeated by monitor.

Monitoring Service.

(A) Undivided attention—frequent supervision, to be absolutely assured of service given.

(B) Divided attention, occasional supervision.

(C) No supervision after conversation fairly started.

For instance, A-1 shown on a ticket would signify that the operator had monitored this connection constantly, and that the service was perfectly commercial. This plan has worked out very successfully, and it not only gives clearer records as to the actual service rendered the subscriber, but is a great help to the operators in educating them to distinguish the different kinds of service.

The study of lost calls is a very important feature of the service and should be given special attention at every office, as it is often found calls are being cancelled on account of poor operating, etc., whereas, if the proper steps be taken to remedy these conditions, the percentage of lost calls for said office would be materially decreased. This would result not only in giving the subscribers better satisfaction, but would bring about a substantial increase in revenues. The present percentage of lost calls for the Toledo office is as follows:

Sent 12 per cent.; received 9 per cent.

Calls not completed by midnight are cancelled and considered lost calls for that day's business. However, these calls are taken up by the chief operator on the following day, and every effort is made to complete any she may think there is a chance of reviving. A great many calls are saved in this manner, and a separate report of these is made to the manager showing the number of calls, and the revenue derived from this source. This same action is taken on any received calls where there seems a possibility of making them good. Through the efforts on the part of the Toledo operators, although a certain number of these would probably have been revived by the subscriber if the initiative step had not been taken by the telephone company, the percentage of lost calls revived each month is as follows: Average sent calls revived over total sent calls lost 11 per cent.; average received calls revived over total received lost 9 per cent. A reason is shown why each call is cancelled and they are listed as shown in the following table, derived from the records of a typical month's business, showing the percentage of calls cancelled for each cause:

Cause.	Per cent.
Unable to hear	.6
Do not answer	11.4
Party refuses to talk	1.
No circuit	7.
Office closed	2.3
Telephone out of order	1.
Line out of order	2.
Party not there	9.
Party out; do not know when he will return	16.
Party unknown	3.
Party absent and not expected to-day	26.
No telephone	10.2
Unable to raise office calls	1.
Wrong number	.5
Total	100.

Service tests are constantly being made in order to ascertain the quality of the service rendered to the subscriber. These tests are made from the subscriber's station, and show the time consumed in getting Long Distance divided into three intervals, as

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follows: First, Time "A", operator answers; second, interval between A operator and answer by L. D.; third, total time consumed in getting L. D. These tests are averaged in groups of 25 each, and at least one group is taken each week. Before the installation of the new equipment these tests showed that from 20 to 25 seconds were consumed in getting the Long Distance operator. To-day these tests show that only from 10 to 12 seconds are consumed in getting Long Distance. This difference in time is readily appreciated by the subscriber who is holding the receiver to his ear waiting for the operator to answer.

In addition to these, records are also taken of the business handled over the various circuits, showing the interval from the time the call is placed by the subscriber until either a definite report is received or connection is established. These records give a very clear idea as to the time consumed, both in passing calls, and getting connections established to various points throughout the territory. As individual efficiency tests, at least once every three months, twenty calls are timed upon each operator in the office. This record shows the actual elapsed time on the connection as timed by the stop watch, which is then compared with the elapsed time as shown on the ticket in question, and discrepancies in time are called to the attention of the operator at fault. This has been found to have considerable bearing on her record as an operator.

The use of the highest grade equipment and the skilful application of a knowledge of the means of securing the best results from the work of the operators under the direction of the traffic manager, Mr. E. D. Kramer, have enabled the United States Telephone Company to bring its service to a high degree of efficiency. The satisfaction afforded the users of this system is a most gratifying proof of the value which is now attached to the Independent telephone service.

A New System of Connections for Telegraphic or Telephonic Multiple Communications

By Dr. Alfred Gradenwitz.

A SYSTEM of connections by means of which some wires can be used in common in connection with several telephone or telegraph stations, communicating with one another only in sets of two stations each, has been designed by Mr. O. Arendt of Berlin, Germany. It may be said that the system can be used with safety both in the case of alternating and undulating currents. The self-induction coils employed to this effect have several windings wound in two groups upon a common iron core, so that an alternating or undulating current is choked if the

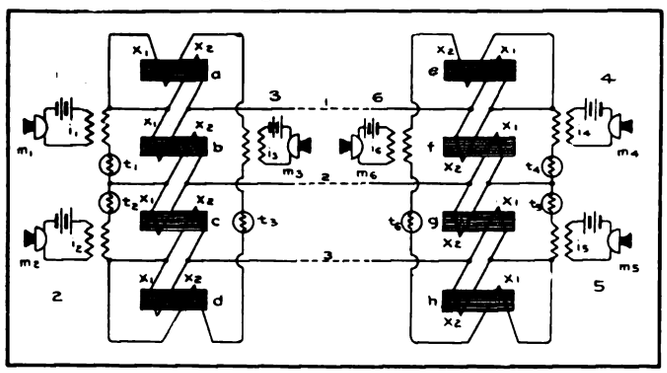

Fig. 1. Arrangement of connections for multiple transmission.

current only traverses one of the groups or some parts of these in the same direction, magnetising the iron cores, while it is allowed to pass when flowing through the two groups or parts of groups in opposite directions, exerting its magnetising action in opposite senses. These coils are connected to the system of conductors in such a manner that the combinations of two line wires liable to be effected at a time with a given number of wires, constitute an independent circuit. The number of connections that may be established with n lines is therefore equal to the number of possible pairs of combinations these lines are susceptible of. If there be, for instance, three lines, 1, 2, 3, the lines 1 and 2, 1 and 3 and 2 and 3, respectively, can be combined to three different pairs of line combinations with the aid of the self-induction coils, so that three pairs of stations are allowed to communicate with each other only on three lines instead of on six. Generally speaking $\frac{n\ (n-1)}{2}$ pairs of stations may communicate with each other simultaneously on n lines. It is recommended to make the self-induction of the apparatus as low as possible, lest the telephone or telegraph current in this apparatus be weakened or branched out over the high self-induction conductors. The self-induction of the coils should, if possible, be so adjusted that with only two windings the self-induction of one coil produced in one of the windings is sufficient in itself to effect the choking action referred to, as well as to prevent the telephone or telegraph current becoming weakened.

In order to show the mode of operation of this system, patents for which have been taken by the inventor, it is assumed in Fig. 1 that the station 1 is connected with station 4 on the lines 1, 2; this connection should not be interfered with by any talking connection of the other station, nor should it interfere with any conversations going on with the other station. The vibrations of the microphone m_1 are transmitted as usual to the induction coil i_1 of the station I in the secondary telephone circuit, whence they return through the receiver t_1, the winding x_2 of the choking coil b, the conductor 2, the winding x_1 of the choking coil f of the station 4, the receiver t_4, the secondary winding i_4 of the transmitting coil, the winding x_2 of the choking coil f in the station 4, back through the conductors 1 to the winding x_1 of the choking coil b in the station 1, whence it had started. These telephone currents thus flow successively through the two windings of the self-induction coil, the action of which is opposed to each other, so that the currents cannot become weakened to any considerable extent by choking. The current cannot either be branched out into other telephone circuits as the different points of the latter do not present any drop in potential to the currents, or because they can only pass through one winding of the self-induction coil or through both windings in the same direction. There will, therefore, be no transmission of speech to the other station. For the same reason any conversation going on between the two stations 1 and 4 will obviously not be interfered with by conversations from other stations. It may be mentioned that one of the wires could be replaced by a ground connection.

In the place of choking coils having two windings or else in conjunction with such, self-induction coils, including three windings on a common iron core, can also be used. This modified system is illustrated in Fig. 2. Considering the windings $y_1\ y_2\ y_3$ of the triple self-induction coils or current chokers g, h, j, k, l, o, it is essential that the winding y_1 be always wound to the left, while the two others are wound right hand. Both the windings $y_1\ y_3$ and $y_1\ y_3$ together thus constitute each a double wound choking coil, one winding of which is shared by two stations, e. g., 1 2, 1 3, 2 3. The three windings $y_1\ y_2\ y_3$ are arranged on a finely divided iron core. These triple choking coils, which are inserted between the lines 1, 2 and 3, work as follows: When a transmission of telegrams or a conversation takes place between the corresponding stations 1 4, at the two ends of the lines, an undulating or alternating current produced in the outfit s_1 of the station 1 will follow about the following path: winding y_2 of the choking coil g, winding y_1 of the same choking coil, line 1, winding y_1 of the current choker k, winding y_2 of the same choking coil, outfit s_4 of station

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4. winding y_2 of the current choker 1, winding y_1 of the same choking coil and outfit s_1. The undulating or alternating current thus always passes successively through two winding y_1 y_2 of the equilibrium to one common point, where they are best put to earth (E). In case the number of lines is greater, a correspondingly greater number of windings y_1 upon all or some of the chok-

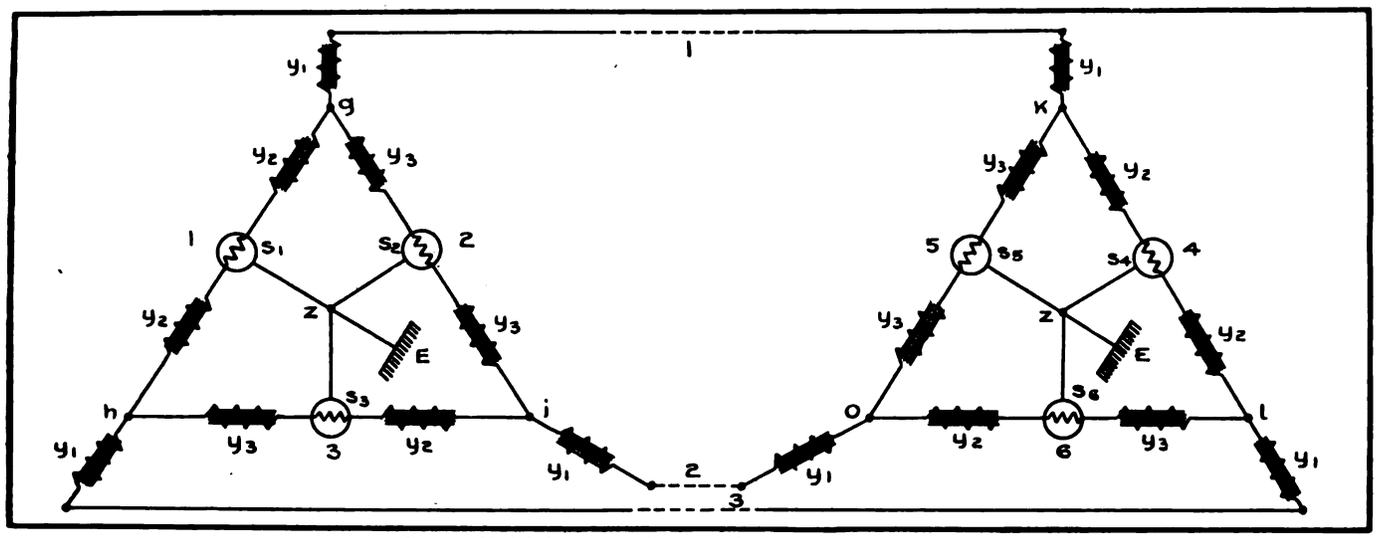

Fig. 2. Modified system using two windings on a common core.

triple current filters, so that the choking effect of all the coils upon the current passing between the two stations 1 4 is entirely compensated for, and there will be no weakening of the conversation or transmission of telegrams between the two stations. The same current cannot, however, penetrate into any other system of instruments, as for these the choking coils are so arranged as to prevent any transmission of current, and the same applies to any telegraph or telephone currents produced in the apparatus of all the other corresponding stations. The station apparatus, s_1 s_2 s_3 or s_4 s_5 s_6 at the other end of the line are connected at their points of electric

ing apparatus should be provided, it being necessary to have in all the lines one of the windings constitute together with one of the other windings y_2 or y_3, a double current choking coil.

The connecting system shown in Fig. 1 can be modified to advantage by arranging two special windings on the same cores acting in opposition in the place of the current chokers a, b, c, d, e, f, g, h; the two special windings being inserted between the apparatus of the station in such a way as to produce a double choking action. The additional winding can be mounted on an iron core, and a similar modification can be made in this system represented in Fig. 2.

Annual Meeting of the Independent Telephone Men of Kansas held at Wichita

THE annual convention of the Kansas Independent Telephone Association was held in Wichita on January 22 and 23. The meeting was largely attended, the secretary of the association stating that between 150 and 200 members were present.

The greatest work accomplished by the association was the adoption of a new constitution and by-laws which enable the local exchanges to form a closer organization in their respective communities.

Little business was transacted at the session held on Monday other than the appointment of a few preliminary committees. The address of the president, A. A. Goddard, of Topeka, was heard, and met with a great deal of favorable comment. An address by W. P. Hemphill, of Topeka, on the subject of "Telephone Revenues" was one of the best that was made before the convention.

A smoker at the Garey Hotel Monday night was tendered the visiting telephone men by the local promoters. Fully two hundred men were present. F. M. Pearl, of Hiawatha, acted as toastmaster.

There was considerable discussion of the advantages conveyed to the State organization by its connection with the National-Interstate Association. Theodore Gary, vice-president of the National-Interstate Association, outlined the work of that organization, and spoke of some of its plans for future development.

The committee on revision of constitution and by-laws, which was appointed at the first session, consisted of W. H. Nelson, of Smith Center; J. E. Byers, of Ottawa; J. C. O. Morse, of Wichita, and W. P. Hemphill, of Topeka. The new by-laws adopted were drawn with the view of forming a more perfect organization between the small local exchanges. The State is divided into six districts, each in charge of a vice-president. The first four districts correspond to the congressional districts bearing the same number. The fifth district consists of the fifth and sixth congressional districts, and the sixth district consists of the seventh and eighth congressional districts.

The following officers were elected for the ensuing year: President, William Nelson, Smith Center; district vice-presidents, first district, C. E. Betts, Atchison; second district, W. Miller, Olathe; third district, A. E. Herzberg, Independence; fourth district, Charles Henderson, Alma; fifth district, John Doyle; sixth district, C. C. Vandeventer, Kingman; secretary and treasurer, F. M. Pearl, Hiawatha; H. D. McVay, of Wichita, was elected a member of the advisory committee for the national committee.

The president was authorized to appoint delegates to the national convention to be held in St. Louis in June as soon as the representation allowed Kansas in the convention was ascertained. The rules allow one delegate for each 10,000 telephones in the State, but as the secretary had not completed his collections and did not know exactly how many units would be represented the matter was left in the president's hands to attend to at a future date.

The selection of a meeting place for the next annual convention was left in the hands of the executive committee.

William Nelson, the newly-elected president, appointed the following executive committeemen: J. E. Byers, Ottawa; A. P. Rogers, Beloit; Harry Camman, Winfield; R. M. Emery, Seneca, and C. S. Brown, Abilene.

Among the representatives of the different companies from the various parts of the State who were present at the meeting were: W. G. Miller, Citizens' Telephone Company, Atlanta; F. W.

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Mackey, Columbian Electrical Company, St. Joseph, Mo.; Homer Caldwell, United Electrical Company, Wichita; A. B. Clarke, Herrington Telephone Company, Herrington; J. W. Smith and F. S. Flint, Minneapolis Telephone Exchange, Minneapolis; R. M. Emery, Seneca Telephone Company, Seneca; C. C. Raymond, Lindsborg Telephone Company, Lindsborg; R. H. Shore, Winchester Telephone and Electric Company, Winchester; T. H. Youmans, Ossawatomie Telephone Company, Ossawatomie; S. H. Williams, Southwestern Telephone Company, Mead; Frank Lanley, Stafford Telephone Company, Stafford; E. B. Kellan, Chase County Telephone Company, Cottonwood Falls; R. C. Hall, Ellis Telephone Company, Ellis; J. A. Zimmerman, Valley Falls Telephone Company, Valley Falls; J. C. Kelsey, Chicago; J. C. Valentine, Northern Kansas Telephone Company, Effingham; J. T. Elder, Home Telephone and Electric Company, Cunningham; C. E. Betts, Atchison; C. C. Vandeventer, Kingman Independent Telephone Company, Kingman; F. M. Pearl, A. J. Stevens and Felix O'Neel, Northeast Kansas Telephone Company, Hiawatha; C. S. Safford, Stromberg-Carlson Telephone Manufacturing Company; W. P. Hemphill, Independent Telephone Company, Topeka; W. R. Pettijohn, Hoyt Telephone Company, Hoyt; George W. Watson, Kingsley Telephone Company, Kingsley; W. W. Dilworth, Soloman Valley Telephone Company, Beloit; W. H. Wilson, Exchange Telephone Company, Smith Center; D. D. Brunwell and J. N. Doyle, Belleville Independent Telephone Company, Belleville; C. A. Starr and B. F. Bess, Pratt; C. B. Anderson, Waubausee Telephone Company, Alma; C. H. Cornwall, R. M. Cornwall and G. Z. Taylor, Mount Hope Telephone Company, Mount Hope; F. A. Gresham, Home Telephone Company, Bucklam; C. J. Rich, Havalan Telephone Company, Havalan.

The companies which had exhibits were: The Ewing-Merkle Electrical Company, St. Louis, Mo.; Frank B. Cook & Company, Chicago; Dean Electric Company, Elyria, O.; Sterling Electric Company; American Electric Telephone Company; the Vought-Berger Company, La Crosse, Wis.; Columbus Electrical Company, St. Joseph, Mo.; Kellogg Switchboard and Supply Company; American Steel and Wire Company; Baldwin Electric Company, Kansas City; Monarch Telephone Manufacturing Company; Chicago Telephone and Supply Company, Elkhart, Ind.; the B. R. Electric Company of Kansas City, and the United Electrical Company of Wichita. The exhibits covered a very comprehensive line and attracted much attention.

Address of President Goddard

A. A. GODDARD, president of the association, after a short review of the position of the Independent companies, spoke substantially as follows:

"For the address, which it is my duty to make as president of this association, I have chosen the subject 'What have we got? and what shall we do with it?' Dividing my text, I take up first 'What have we got?' and, answering the question myself, say we have got one of the best business propositions in the country. The telephone business is new, younger than any of us. The instrument was first a toy, and then a convenience, and now it is a necessity. The steam engine, the railroads, the telegraph, do not come so close to the everyday lives of the public as does the telephone. You have noticed how rarely a person ever dispenses with the use of one after being once accustomed to it. The business man never quits. The family that has a telephone, if it meets hard times, will cut out the summer vacation, reduce wearing apparel and living expenses generally before it abandons its telephone service. It appeals more and more to all classes of society. The service is growing better, the rates are reasonable, perhaps too low, and the cry of every telephone company in the land is that the growth of its property is overwhelming.

"In experience we find that people usually pay for a thing all that it is reasonably and fairly worth; and they do this without complaining. It will be found the same with the telephone service. People will be willing to pay a fair price for what they receive if they are only given to understand that the consideration is a reasonable one. It is best in dealing with the public to be frank and honest. When the people understand what depreciation means in telephone business and have a general knowledge of the cost of operating and maintaining a telephone exchange they will not complain of the rates. In cases where rates are too low to be remunerative, a fair amount of education should make it possible to raise the rates. This has been done in a good many instances without the loss of a single subscriber. It is necessary in such cases to be very frank with the public and explain fully that the business cannot be carried on and good service maintained at the going rates.

"I believe that the telephone business is generally more profitable than the average business occupation throughout the State, but in order to get the best out of any business it must have careful, thorough and alert management. The telephone manager should study his business as hard as he can, giving thoughtful attention to all its details and its every relation with the public if he would get the best results.

"When you have got your telephone plant, what will you do with it? It is constructed for the ostensible purpose of serving patrons. You and your associates have invested your money in the proposition for what it will earn. You then use the plant to furnish service to the subscribers and earn dividends for the stockholders. In order to furnish good service you must have a good plant, properly handled. It is necessary that the instruments be in first-class working order and they be kept so at all times. It is also necessary that the operators be prompt, courteous and accurate. In order to keep the plant in proper condition it is of the greatest importance that the primary construction should be of the best; that all repairs and replacements be made in such manner that they will not weaken the service and that the work need not be done again for as long a time as possible. It is frequently difficult to get good operators, and more difficult to keep those you do get continuously active and alert in the performance of their duty.

"The subscriber who has never seen the inside of a telephone exchange has small idea of the difficulties attending good service. Here again it is valuable to take the public into your confidence; invite them to the exchange to see a busy switchboard and the trouble which the operators have. The better they are acquainted with the business the more charity they will have for the operators and the better feeling they should have for the management. The manager who is keen to keep his service up to the best possible state and to keep the public friendly toward the company is performing an invaluable service for the stockholder, while the manager who is grouchy with the public and who cannot manage the operators and keep them courteous to the patrons should be discharged at once.

"So much for the question of service. We now come to the question of profits, and at the outset let me say that the account which is the greatest hindrance to the distribution of profits in the telephone business is the maintenance account if properly kept. If the construction, in the first place, is heavy, leaving a large margin above safety, it is economy. If the repairs are equally heavy and substantial, that is also economy. I am aware, and some of you are painfully so, that there has been a good deal of poor construction in this State, but the plants can be gradually built up, strengthened and improved until they are made right and the mistakes corrected. The maintenance account does not show its ugly head very early in the beginning of the business, but it usually is abundantly in evidence later on.

"I think it is generally customary for telephone companies to put all their net profits into construction. This is frequently a mistake. Capital invested should receive dividends as the business progresses. Your stockholders will be better pleased by the payment of one dollar in dividends than they will if you tell them

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that the plant has increased in value two dollars. But you say, 'Where is the money to come from?' You say if there were no construction we could pay good dividends, but so many people are ordering telephones, and the business is growing so it takes every dollar we can scrape together. A plant that is trying to carry its construction out of net earnings is very apt to get in debt and have its business handicapped thereby. There is plenty of money in every community to own and build all the telephone lines that are needed in that community, but before money will be invested in such propositions people must be convinced that the investment is a good one. If you have a few stockholders in your company to which you have paid dividends regularly for a few years, they will, if your business looks right, want some more stock for themselves or their friends, and they will tell people that your stock is good. Suppose you own 75 per cent. of the stock yourself, and 25 per cent. of it is outstanding among your people. You want your profits to be kept in the company. If you have a margin of unsold stock and declare a dividend by which you receive a considerable sum of money, and the other stockholders smaller sums, you can reinvest your dividend in additional stock of the company, and it will be much easier for you to sell more stock outside, or dispose of your stock if you so desire, if it is known that the same has been receiving dividends. So long as the maintenance and depreciation are provided for out of the earnings of the company and the moneys received from the sales of the stock go into additions to the plant, the increase of capitalization is not only legitimate and proper, but it puts the plant and the business in a better financial shape for handling.

"Telephone people and companies should understand that if a company has a plant worth $50,000 and earning a good rate of interest that it will be difficult to sell it for $50,000 if you have only $25,000 of stock outstanding. Now, don't understand me as favoring over-capitalization, but I do mean to say that a corporation should, in the interests of its stockholders, have out as much capital as will equal the net value of its properties, and it will be found that it will be easier to sell the property if it is to be sold outright or in parcels. It will be easier in the case of a merger of telephone interests, which is something you may expect in this state, and it will be easier to borrow and obtain credit if the corporation is capitalized at the proper amount.

(To be continued.)

THE CHICAGO ELECTRICAL SHOW.

NO better opportunity to note the vast progress of the electrical business was ever afforded than by the exhibition held at the Coliseum in Chicago from January 15th to the 29th. At every turn the visitor was confronted with new and novel uses for electric current, and at those exhibits where the well-known applications were demonstrated the increased perfection of the apparatus was a continued source of wonder and comment.

The exhibition opened on the 15th, and from then on to the close not a day passed but some interesting event took place. A wireless message from President Roosevelt was received through the apparatus of the De Forest Wireless Telegraph Company at 8 o'clock on the opening night. C. H. Thordarson demonstrated the properties of high tension spark discharges and Professor Clarke gave a spectacular exhibition of high frequency discharges employing exceptionally large Rhumkorff coils.

The light and power companies of Chicago had on exhibition a number of devices for home use employing electric current. These included heating and cooking appliances of all descriptions and a complete kitchen equipment in full operation demonstrated the usefulness of the apparatus.

An interesting feature of the exhibition was College Row. Here the leading schools and universities of the Central States displayed in an attractive manner photographs of the buildings and grounds and products of their laboratories. The Armour Institute of Technology and the Universities of Wisconsin, Colorado and Purdue were represented, and a large number of their students visited the exhibition.

January 17th was observed as Franklin day, it being the bicentenary of that famous scientist's birth. In commemoration of the occasion bronze medallions were distributed by the company. January 23, 24, 25 were designated as Independent telephone days, and on these dates large numbers of operators and managers visited the exhibition and held informal conferences. The general opinion appears to be that the Independent movement will receive the greatest impetus, to its development this year that it has ever known.

Among the exhibitors of telephone apparatus and supplies were the Automatic Electric Company, which had an interesting exhibit of its automatic exchange in operation; the Belden Manufacturing Company, Chicago, showing many varieties of magnet wire; the Electric Appliance Company, Chicago, with a general exhibit of supplies and apparatus; the National Carbon Company, Cleveland, displayed a full line of dry and wet cells; the Sandwich Pole Changer Company, of Sandwich, Ill., had an exhibit of its pole exchanger and duplexer, and the Stromberg-Carlson Telephone Manufacturing Company exhibited a complete line of magneto and common battery apparatus. Amongst the battery manufacturers were the Electric Storage Battery Company, of Philadelphia, and General Storage Battery Company. Roth Brothers & Co. exhibited power apparatus for telephone exchanges and caused a considerable amount of comment by its interesting display.

Music for the entertainment of the visitors was furnished by Weil's band, of St. Louis. Every afternoon and evening attractive programmes were rendered, which greatly added to the interest of the show. The telephone exhibits were always surrounded by large crowds of spectators, and the lively interest shown in the development of the apparatus proved very conclusively that this branch of electrical engineering is one which is being very carefully watched. In every way the exhibition was a grand success and the extraordinary number of out-of-town visitors who attended the show not only evidenced a lively interest in the exhibits, but also either directly or indirectly resulted in the placing of many orders for electrical apparatus of all descriptions.

INDIANA TELEPHONE MEN OF THE EIGHTH DISTRICT MEET AT RICHMOND.

THE third quarterly meeting of the Eighth District of the Indiana Independent Telephone Association was held at Richmond January 24. Representatives were present from every county and a majority of the Independent telephone companies of the district, together with several visitors from outside.

Mr. A. C. Lindemuth, president of the district organization, and vice-president and member of the executive committee of the State association, presided. Mr. George Watts, of Knightstown, was elected temporary secretary in the absence of C. A. Phelps. The morning session was devoted to the regular order of business, including reports from committees, appointment of new committees and new business. All of the twenty delegates and visitors present were the guests of the Richmond Home Telephone Company at dinner at the Westcott Hotel. At the afternoon session, Mr. W. Gilbert Thompson, general manager of the Home Telephone Company, of Hamilton, Ohio, read a very interesting paper on "Two Independent Telephone Companies as an Investment, and Their Management," the two companies referred to in the paper being the Valley Telephone Company, with seven exchanges, operating in Warren and Trumbull counties, and the Home Telephone Company, operating at Hamilton and throughout Butler County, Ohio, both being under one management. The paper clearly demonstrated that Independent telephone companies, established even under the most unfavorable conditions, can be made to pay dividends and placed on a solid basis if right business methods are employed. Mr. Wm. M. Bailey, superintendent of the Richmond Home Telephone Company, read a paper entitled "How Can We Improve Our Local Telephone Service," in which he discussed the relative speed of service through common battery and local battery magneto calling systems. His paper indicated a comprehensive and practical knowledge of the entire conditions that make for better service. Both of the above papers were well received and brought out a spirited discussion.

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THE EDITOR'S PAGE

THE TELEPHONE IN REPORTING.

AN interesting illustration of the manner in which the telephone assists in the development of another branch of public service is given in its extensive use by modern newspapers.

The furnishing of news to the public imposes no demand upon its gatherers, with the exception of the single quality of accuracy, which is more important than the necessity for speedy transmission. The success of a paper in selling its story of a matter of large interest may depend upon its getting the issue upon the street or to the railway station only a few minutes ahead of its rivals. To do this the most strenuous efforts are made by reporters to utilize every possible means of saving time in reaching the scene of action. Once on the ground all men are likely to be on comparatively equal terms and the facts are quickly gathered. The next step in the old method of getting the story to headquarters was to hurry to a telegraph station. Now, however, the almost universal use of the telephone has made it possible for a man to get in touch with the home office from almost any region. Many newspapers have experts seated at typewriters and provided with a telephone instrument. Wearing a head receiver, these operators take the story as rapidly as it can be given by the man at the distant end of the line. In this way a saving of time is effected by the cutting out of many items which caused delay in the transmission of messages by telegraph. These not only include the amount gained through the wide distribution of telephone instruments which may be connected to long distance lines, but a saving in time in operating which produces a material gain. Such messages, also, are nearly complete, and require a comparatively small amount of revision. The big daily papers are enabled in this manner to place before their readers important news after an almost incredibly brief interval.

Even the farmers' lines are frequently brought into use for this class of work. A recent instance of this sort occurred in the Southwest. A fugitive from justice was being pursued across open country and public interest in the chase was so intense that the newspapers issued frequent bulletins giving the details of its progress. The news was secured by means of telephones located in different houses passed by the sheriff's party with whom the reporters were traveling.

In the handling of items of minor importance, such as local news in cities of considerable size, the telephone also performs an important service. Each man engaged on this class of work may start out with a single assignment. As soon as he has looked up the facts he goes to the nearest telephone and dictates his report to an operator at the office end of the wire who writes the story. The reporter is then ready to receive another assignment. The advantage of this lies not only in the gaining of time on each report, but in the fact that the office is almost constantly in touch with each man. On receiving notification of an event of importance it is possible to place the right man on the ground in the shortest possible time.

Papers in smaller towns are extending the scope of their news in a manner which will do much to assist in their competition with the newspapers in the large cities which have an extensive outside circulation. A long distance company in Indiana is permitting the use of its lines for the transmission to papers in this class of news of national interest, embodied in a special service derived from one of the great central bureaus. In this way the local paper which receives this service is enabled to place in the hands of its readers, some hours before the arrival of the paper from a large city, the news of events which it could afford to obtain in no other way than by telephone.

For direct communication between persons in different places the unapproached value of the telephone has long been conceded. Its establishment as one of the steps in the chain by means of which most important events are made known to the public now seems secure. We may expect that the time is not far distant when every paper will display as one of its chief claims for patronage the words "News receved by telephone."

IMPROPER USES OF THE TELEPHONE.

THAT disadvantages can be found in almost every class of public service is a well-known fact, and it seems that the telephone is no exception to the rule. A recent case in point came up in a Boston court, and it was so novel that the report has been widely copied by the daily press throughout the country. It seems that the wife of a much-occupied business man was in the habit of calling him up many times in the course of a day, causing interruptions of his work by her conversations about matters which he considered of minor importance. After all the home remedies had failed this much annoyed individual seems to have been determined to take the most effective measures, for he applied to the court for an injunction.

This is a desperate case, but is by no means single, as far as its cause is concerned, even in the same locality. Reports have been known to come from exchanges in the suburbs which indicated that many unnecessary conversations passed over the lines to that city in the course of a day. For instance, one well-known business man was accustomed to receive a call from his country residence located some thirty miles from town every morning, shortly after his arrival, and in the afternoon a second was quite likely to follow. It is said that the first call usually was taken up with an inquiry as to whether he had mailed the family's letters. It may be that things of this sort are quite sufficient to account for the demand for a strictly secret service that is said to be so strong in some quarters.

This question of the use of the telephone for unimportant conversations seems, however, to be a matter not confined to any particular locality. A man in Portland, Ore., has put himself in the same class with the Boston objector. In this case the trouble did not happen to be a strictly personal annoyance. The man had no complaint against the telephone as a receiving instrument, but at his home conditions were different. The telephone was treated as a toy which must be kept constantly in use. The number of unimportant messages from this instrument must have been so great as to exercise a sensible effect on the average rate of calling for the exchange in question, for the aggrieved individual thought it called for a public announcement of his sense of wrong. This was an instance where the telephone was so fascinating that all home duties were neglected in order that the new game might be played to the utmost.

There is a serious feature in all this, which lies in the fact that the use of a telephone system for trivial purposes puts an unjust burden upon not only the company which furnishes the service, but upon the public at large. Every unnecessary message puts the same burden upon the operating force as a serious one, is sure to increase the number of busy reports, and otherwise injures the efficiency of service. Moreover they seldom bring any return to the company which bears the burden of handling the work. The limiting of the number of such connections affords one of the chief arguments in favor of the measured service plan of making charges.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

COMPULSORY USE OF CONDUITS.

We presume this is an old question, but would like to know if there are any cases that hold that a city cannot compel a telephone company to use public conduits in the street. T. P.

WE do not know of any rulings to that effect. The consensus of opinion is that the company can be compelled to use the conduit since it is presumed that the municipal officers will make proper regulations for the use of a conduit by different companies, which are expected to use the same jointly. Geneva v. Geneva Telephone Company, 30 Misc., 236, 62 N. Y. C. 172.

FREE TELEPHONES IN NEW CITY BUILDING.

Our company in its franchise agreed to give free telephones in all buildings belonging to the city which are occupied as police and fire stations. The city tore down one of its old buildings and erected a new one in its place. The instruments we now furnish are much improved and more complicated than those we used at the time our charter was procured. Are we required to put our instruments in the new station? The city also contemplates putting up a new building in a place where there never was any before. Must we provide this building also with a telephone? J. C.

IT is the editor's opinion that your company could be required to furnish a telephone for the new building, which has been erected as a substitute for the old building, but he does not think that you could be required to install a telephone in a building that was not in existence, nor in the contemplation of the parties to your franchise when it was granted. See Kensington Electric Co. v. Philadelphia, 187 Penn. St., 41, A, 409.

PERIOD OF EXCLUSIVENESS.

Our company's franchise provides that it shall be exclusive as against all other companies for a period until, from its earnings, it shall have realized and divided among its stockholders for five years a dividend of eight per cent. Five years have elapsed and up to the present time our profits have somewhat exceeded fifty per cent. in all, but they have been invested entirely in improvements and have not been set apart at all as dividends. The city authorities claim that our period of exclusiveness has passed and that they are at liberty to grant a franchise to a company that wishes to compete with us. Please give us what light you can on the subject. E. L. J.

THE courts have held that such a period of exclusiveness as you mentioned is not terminated by the fact that your profits have exceeded the amount mentioned, where they have been invested in improving your system and not in paying dividends to the stockholders. It is the idea of the courts that the franchise should be strictly construed. See Wilkesbarre Electric Light Company v. Wilkesbarre Light Company, 4 Kulp (Pa.) 47. The point to be on your guard against is whether the council or authorities who granted you your exclusive franchise had authority to do so.

THE CUMBERLAND COMPANY A TRESPASSER.

THE last prop has been knocked out from under the Cumberland Telephone Company at Evansville, Ind., by the decision of the United States Court of Appeals, which, in affirming the District Court of Indiana, holds that the Cumberland company is absolutely without right in the streets of the city and a trespasser. The court thereupon dissolved the injunction that had been in force and there is nothing now to prevent the city from ousting the company from the city. There is no right of appeal in this case except on a writ of certiorari to review the facts in the case. This will not be done.

The Cumberland Telephone Company has been at loggerheads with the city of Evansville for twenty years. The case just decided is of long standing. In 1887 a franchise was presented to the Board of Public Works by the Cumberland company, and a resolution was passed affirming this franchise. The franchise provided that after fifteen years, if the city saw fit, the franchise could be revoked. The contention arose that the city could revoke the franchise in 1902, the expiration of the fifteen years. On Jan. 3, 1902, the Board of Public Works passed a resolution to revoke the franchise when the time came and they presented this resolution to the council for ratification. It was speedily ratified and signed by the mayor. At this juncture the company submitted a draft of a new franchise and asked its adoption. The franchise presented recited that the new one would go into effect at the expiration of the 1887 franchise. In this franchise the Cumberland company offered the city $10,000 and free telephone service for a twenty-five-year lease. This was signed by the Board of Public Works, but the council refused to ratify it. Litigation was commenced. Fearing that the poles and wires would be cut as was done in 1886, the company brought suit for a restraining order. In its complaint the company claimed that it had never operated under the 1887 franchise, but had been since that time operating under a franchise assigned to it in 1882 by the Evansville Telephone Exchange Company, a local concern.

After the suit was in court and the company foresaw defeat, it offered the city $100,000 and free telephone service, underground wire system and all modern improvements for a forty-year franchise. This was refused because the length of time was greater than the city could allow.

Judge Anderson, of the District Court, held the company was without franchise rights and the company appealed. During the appeal, which continued the restraining order, Judge Anderson prohibited the Cumberland Telephone Company from making any changes in its system in the city without first gaining the permission of the Board of Public Works. Now that the decision is in favor of the city the Cumberland company is on the same footing with the Pocket Independent Telephone Company, or any other company that may ask for a franchise. That the city of Evansville is in a position to grant a franchise to an applicant on most favorable terms is admitted. The Independents believe a favorable opportunity is at hand to get a foothold in Evansville, and it is likely that they will seize the opening.

ALL MEMBERS OF AN INCORPORATED COMPANY MUST SUE.

ACTION was brought by E. P. Webster at Sioux City, Ia., against E. P. Spalding to recover a telephone valued at $6.50, which was one of twenty used in connection with a farmer's line at Glen Ellen. The telephone was originally owned by Mrs. A. S. Gillette, who was one of the original members of the company. Mr. Webster was the responsible head of the company and was instrumental in organizing the company. Mrs. Gillette sold her farm, and when Mr. Webster came to claim the telephone Mr. Spalding, the new owner of the place, insisted that the telephone was a part of the property and rightfully belonged to him and his estate. The suit was decided against the plaintiff on the ground that the company was an unincorporated voluntary association and that it was necessary in such case to make all of the parties plaintiffs. No one member could maintain the action.

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QUERIES

BRANCH EXCHANGE TROUBLE.—(652.)

A branch exchange of the type using the circuit which I forward herewith is supplied with current from the central office battery over wires in cable. Sometimes the fuses at the central office in the battery supply leads are blown. In this case the relay on any cord circuit at the branch exchange buzzes as soon as the operator plugs into a central office jack, and it is impossible to use the circuit until a special key is operated. Will you please explain the cause of this trouble? C. R.

The current for the branch exchange is supplied from the central office over a pair of wires R, S.

The — side of the branch exchange battery goes to the winding F of the relay, and through this winding to the sleeve of the plug. On the insertion of a plug in a jack connected with a central office trunk with the key I in its normal, or closed position, current flows from the negative side of the battery through the relay, winding F, sleeve of plug G, sleeve of jack H, and key I, to ground, J, operating the relay and cutting off branch exchange battery from the cord circuit. The operation of the relay is thus seen to be due to the passage of current from the negative side of the battery to ground through the circuit indicated.

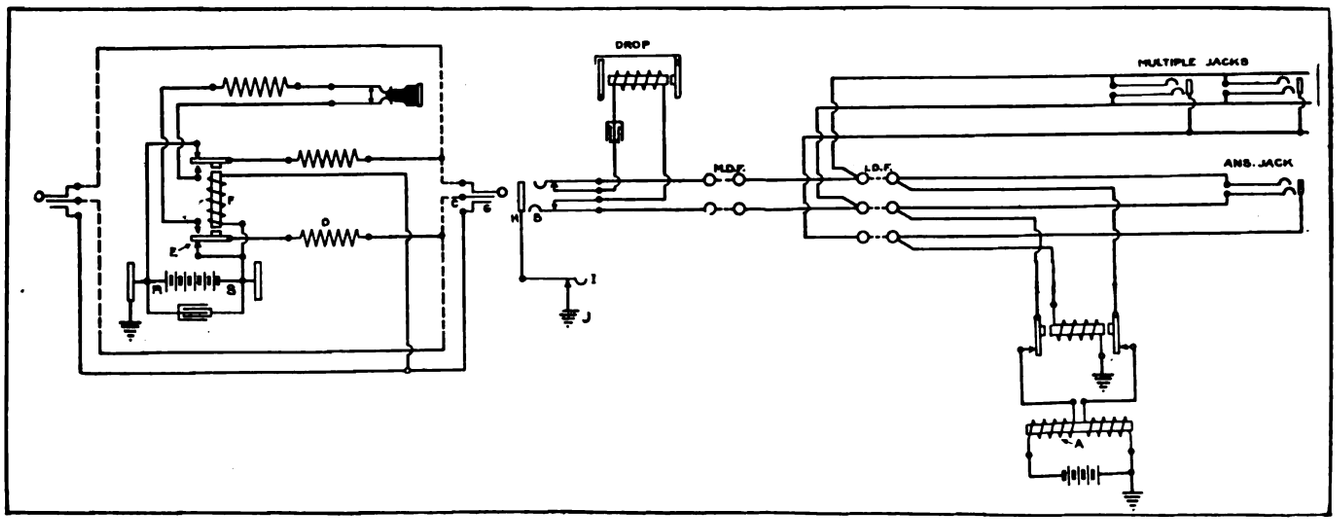

Fig. 652.

In case of the rupture of a fuse in battery leads R, S, at the central office, when a cord is connected to a trunk line there will still be a path from the exchange battery through winding A of the line relay, ring side of line, ring of branch exchange jack B, ring of branch exchange plug C, winding of retardation coil D, contact E, winding of relay and thence to ground as before. On the operation of the relay, however, with the consequent breaking of contact E, current ceases to flow through its winding and the armature falls back. The operation is then repeated, and the result is a continuous buzzing of the relay. Formerly branch exchange circuits were not provided with the key I. On the modern circuits in which this key is used its operation breaks the circuit to ground, prevents the buzzing of the relay, and permits the operator to call and talk with the central office in the usual manner. On account of the special function assigned to it this is frequently known as the "Emergency key."

TESTING BY LOSS OF CHARGE METHOD.—(653.)

Will you please make plain the insulation test of underground cables by Loss of Charge Method, giving an example? Is this method accurate enough for all practical purposes? J. T. E.

The value of an insulation resistance by loss of charge method is determined by measuring the proportion of the charge which leaks out of a known capacity in a given number of seconds through its insulation resistance. The formula is as follows:

Let c = capacity of cable conductor in microfarads,
t = number of seconds charge is allowed to leak,
d = deflection of galvanometer when capacity is discharged through it without being given any time to leak,
d^1 = deflection of galvanometer when capacity is discharged through it after being allowed to leak t seconds,
x = insulation resistance in megohms,

then

$$x = \frac{t}{c \times 2.3 \times \log_{10} \frac{d}{d^1}}$$

For example, let us suppose a single conductor in a cable one-half mile long whose capacity is .04 microfarad to ground. A grounded battery of sufficient strength to give an easily readable deflection is applied to this conductor. It is then removed and immediately the conductor is put to ground through the galvanometer and the momentary deflection noted. Let us assume this to be 10 divisions.

The battery is then again applied and removed. The time of removal is noted, and after 23 seconds have elapsed, the conductor is again discharged through the galvanometer. Let us assume this to show five divisions.

From the formula this gives us

$$x = \frac{23}{.04 \times 2.3 \times \log_{10} \frac{10}{5}}$$

$$= \frac{23}{.04 \times 23 \times .301} = 830 + \text{ megohms}$$

The accuracy of this method is largely dependent on the accuracy with which the momentary throws of the galvanometer may be read and on the proportionality of its scale.

Great accuracy in these measurements is not of great value since the insulation resistance is generally partially composed of a moisture leak which of itself is of a more or less variable nature.

In general the method is only of practical utility where the tester desires to arrive at an idea of the approximate value of an insulation which is too great to show an indication on any of his regular measuring instruments.

Results having an accuracy of about 10% may be obtained by this method, using the ordinary needle type of D'Arsonval galvanometer having a sensibility of half a megohm, and which are usually furnished with bridge sets.

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IN THE OPERATING FIELD

ITHACA INDEPENDENT COMPANY DISPLACES BELL IN SEVERAL NEW YORK TOWNS.

THE Ithaca Telephone Company has recently completed arrangements for connections with several smaller companies which have broken off their association with the Bell company for this purpose. The companies included in this extension of Independent service are those operating in the towns of Newfield, Enfield, Trumbull Corners, Hector, Ulysses, Burdette, Mecklenburg and the surrounding territory adjacent to these centers.

The Ithaca company will control the only lines running into these places. The wires of the Bell company, which have heretofore been connected with the exchanges, were cut in order that the connections might be made with the Ithaca company.

Manager R. B. Fegan of the Ithaca company has avowed his intention of making Tompkins the banner county of the Independent lines, and has already done much toward the accomplishment of his purpose.

The business of the company has grown rapidly, 231 telephones having been added to the list of subscribers in the city alone during the past three months.

Preparations are being made to carry on a campaign of enlargement and improvement. Three cars of conduit, two cars of cables and one car of three-inch iron pipe are at hand for the extension of the underground plant in Ithaca.

GROWTH OF COMPANY OPERATING RURAL LINES IN PENNSYLVANIA.

AT the annual meeting of the stockholders of the Conestoga Telephone and Telegraph Company recently held in Morgantown, Pa., there were brought out some interesting facts illustrative of the rapid growth possible to a well-conducted rural line company.

This is the pioneer rural telephone company in Berks County. The enterprise was planned in January, 1902, and during the spring and summer was developed through the assistance of the farmers, until more than thirty farmhouses and business places were connected at the end of the year. Since then it has grown rapidly to meet the requirements of the public. Two wires are running to Reading, and Pottstown is connected. A new line is being constructed from Birdsboro to Baumstown and one to Stonetown. About 200 instruments are now in use and two exchanges are in operation, one being located at Morgantown, and the other at Birdsboro. The capital stock of the company has been increased from the original amount of $5,000 to $15,000. This increase has been used in extending the lines, which now cover a considerable extent of territory.

Before the close of the meeting an election was held at which officers for the coming year were chosen as follows: Henry M. Hertzler, president; E. M. Zerr, recording secretary; Stephen H. Mast, treasurer; Jacob Hartz, general manager; H. E. Plank, B. Frank Kurtz and John W. Jacobs, auditors.

TOLEDO INDEPENDENT COMPANY HAS ENCOURAGING LEAD OVER ITS COMPETITOR.

ON New Year's day the Toledo Home Telephone Company had 10,031 telephones in operation. That the Home people are far outstripping the Bell company is clearly evidenced by a comparison of the net increases made by the two companies during the past year. The Home company made a net increase of about 2,500 telephones, while the Bell company did not make half that showing, the exact number being 1,020 for the year. Both companies have an army of solicitors in the field, the Bell company having imported a score of "fighters," but the Home company is so popular that it is hard sledding to get business for the Bell telephones. The Bell people have less than 5,700 telephones in operation, while the Home plant cares for nearly double that number, and it doesn't take a prospective subscriber but a moment to see the broader field for service in subscribing for a Home telephone.

INDEPENDENT COMPANY AT JOHNSTOWN TO IMPROVE ITS SYSTEM.

EXTENSIVE alterations and improvements, to cost about $100,000, have been decided upon by the directors of the Johnstown Telephone Company, of Johnstown, Pa.

When this sum is paid out their properties will represent an investment of nearly $550,000.

Among the extensions planned is one by means of which all the subscribers in the Moxham district will be attached to the main exchange, thus giving them direct communication with the city. The office in the Lorain suburb will be abolished.

Plans have been approved for the installation of a subway system in the Fifth and Sixth wards, which have hitherto been without this device, and additional copper circuit wires to Seward, Lilly and Hooversville. Money for these improvements will be secured by the issuing of additional stock.

The old staff of officers has been re-elected as follows: President, Chas. Griffith; treasurer, P. F. McAneny; secretary and general manager, Edward Schade. The directors are: Charles J. Mayer, H. H. Weaver, P. S. Fisher, John Emmerling, Dr. J. B. Lowman, Wm. H. Smith, James P. Thomas, Charles Griffith and P. F. McAneny.

RAPID GROWTH OF HOME COMPANY OF MERIDIAN, MISS.

LESS than a year ago construction work was started on the plant of the Home Company at Meridian, Miss. In the first telephone directory just issued over 970 local subscribers are listed, which is a remarkable record for a new company operating in a town of this size. Direct out of town service extends to fifty-five points in Mississippi and Alabama. It is interesting to note that the directory is gotten up in a very attractive manner. Besides the regular alphabetical listing there is a business guide which localizes all the different classes of business in the town under descriptive headings such as grocers, doctors, hotels, etc. Every page carries advertising, which undoubtedly greatly assists in reducing the cost of publishing. On the back cover is a time table of the principal trains entering the city.

A unique method of designating party lines is employed. The colors red, white, blue, green are used for the four parties. Thus if a party on line 724 was required, the designating color would be given, in addition to the line number, to enable the operator to signal the right instrument.

GOVERNOR OF NEW YORK DISCUSSES RATE QUESTION.

IN his recent message to the Legislature Governor Higgins gave some views on the subject of high rates for public service which, in view of their source, should be decidedly interesting. He said:

"Private companies control our railroads, telegraphs, telephones, gas and water supplies and other services which have become necessary to the daily lives of many of our citizens. Such companies are quasi-governmental agencies, vested with the sovereign power to condemn private property for their uses. They are permitted to exist because the State delegates to them its own functions for convenience and economy and to promote industrial

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development. Such corporations should be tolerated only so long as their rates are reasonable and their service prompt and efficient.

"It has been suggested by a learned justice of the Supreme Court of the United States that such companies have not even the constitutional right to a profit on their investments and that, while they cannot be required to do business at a loss, they may be compelled to content themselves with a return equal to the cost of operation and maintenance. So radical a theory has not been adopted, but that it should be declared from the bench of our most eminent and conservative tribunal is a significant suggestion of the power of the people to regulate public service companies, or failing therein, to exercise their functions directly through government—State or local."

This statement, taken into consideration with the recent decision of the Supreme Court whereby the Hudson River Company was compelled in one instance to maintain the lower rate granted by a company which afterward became a sub-licensee, gives an important key to future possibilities in New York State.

INDEPENDENT COMPANY MAKING RAPID PROGRESS IN CITY OF MEXICO.

THE cornerstone of the central exchange building of the New Telephone Company will be laid in a few days, the foundations having now been completed. It will rise to a height of three stories. The building, with the exception of the foundations, which are of stone, will be of steel construction. The exchange will be opened in about three months.

The work of the New Telephone Company during the past year, only six months of which it was engaged in the laying of its underground system, was remarkable in that the estimates that it had made were considerably exceeded. More than half of the entire underground system is now laid. The actual number of duct feet of conduits laid up to the close of the year was 320,000 out of a total number of 600,000 duct feet that the system calls for. The company had not planned on the large number that it succeeded in laying, but, as it had the permission of the government to complete the work as soon as possible, and as it was anxious to make as short as possible the time that the public would be required to wait for its service, it kept the work moving with great rapidity. The same policy will be followed during the present year, and no time will be lost in bringing the whole enterprise to a speedy conclusion.

There were nearly eight kilometers of trenches dug during the time that the company has been at work on the laying of the underground system.

The entire central portion of the city has now been completed and the company is ready to start on the outlying sections. The section of the city embraced within the American colony will be well covered with conduits, and the people of the colony will in a few months have no cause to complain of the lack of telephone facilities. The company has about finished laying its larger conduits containing thirty-seven ducts, and in the outlying districts of the city, where it will now work, the smaller sizes, particularly the four duct conduits, will be employed.

QUINCY, ILLINOIS, TO HAVE IMPORTANT INDEPENDENT TOLL LINES.

ENGINEERS are preparing plans for a number of new lines which will put Quincy Independent subscribers in communication with important outside points.

Charles Wheat, superintendent of the Quincy Home Telephone Company and also of the newly organized Quincy Long Distance Telephone Company has stated that one line will be built to Kansas City to connect with the long distance interests there, while another will be built to Keokuk, where it will connect with the Mississippi Valley Telephone Company's lines, which run to Minneapolis and St. Paul; a third will be built east to connect with the Interstate lines, which will give the local company wires into Indiana and Ohio, and a line will be built to Hannibal and St. Louis, at the latter place having direct connection with the Kinloch system.

It is the understanding at this time that the Postal Telegraph Company will use the Quincy Long Distance Telephone Company's poles and wires between St. Louis and Keokuk and also to Kansas City. The local Postal wires will also be placed underground in the Quincy Home Telephone Company's conduits.

The work on the system in the city of Quincy is being pushed rapidly. The drawing of cables through the underground conduits will be under way inside of the next four or five weeks.

It is the intention of the Home and Long Distance companies to thoroughly cover the local territory and to provide connections with all important outside points.

CONTRIBUTORILY NEGLIGENT IN COMBING HIS HAIR.

AN interesting case recently decided by the Supreme Court of Wisconsin is that of Grant Owen, appellant, vs. the Portage Telephone Company. Owen had taken the disconnected end of a wire belonging to the company and hung it up in the pump house on his farm. While combing his hair before a mirror in the pump house near this coil of wire in 1903 he was struck by a flash of lightning, apparently coming from this coil of wire. He brought suit and was awarded $1,000 damages, but the court held there was "want of ordinary care on the part of the plaintiff, which contributed to the injury." The plaintiff moved to reverse the answer to this part of the decision and, failing in such relief, that the verdict be set aside and a new trial granted. Such motions were overruled and judgment rendered for defendant on the verdict from which plaintiff appealed. The lower court is sustained.

INDIANAPOLIS TELEPHONE COMPANIES MAKE CHANGES IN MANAGEMENT.

THE Indianapolis Telephone Company and the New Long Distance Telephone Company have recently announced important changes in the management. For the Indianapolis Telephone Company, Hon. Harry S. New was elected president; George C. Hitt, vice-president, and also secretary-treasurer, and A. L. Tetu, general manager. The directors are: Harry S. New, J. H. Holliday, Cortland Vancamp, Jesse Fletcher, A. L. Tetu, H. C. Stifel, Jas. S. Brailey, Jr., and A. H. Bauer. With the exception of the last three named all are Indianapolis men.

For the New Long-Distance Telephone Company the following officers were elected: President, H. C. Stifel; first vice-president, H. S. New; second vice-president, George C. Hitt; secretary-treasurer, George C. Hitt; assistant secretary, C. S. Norton; general manager, A. L. Tetu; directors, H. S. New, M. B. Wilson, A. L. Tetu, H. C. Stifel, J. S. Brailey, C. M. Forster, Breckenridge Jones and A. F. Ramsey.

While he will give to the Indianapolis companies the full benefit of his wide experience in the operation of telephone systems, General Manager Tetu will continue to occupy a similar position in the Nashville Home Telephone Company, of which he will still be in active control. The board of officers, as it now stands, is composed of men of recognized ability and useful experience, and the successful working out of the plans they have in view for the development of these properties seems to be assured.

CITIZENS' TELEPHONE COMPANY PLANS FURTHER EXTENSIONS IN WEST VIRGINIA.

THE Citizens' Telephone Company, now operating lines located in the lower end of Wood County and extending over a large portion of Jackson County, is planning still greater developments.

The company operates many rural lines and almost without exception every farmer living along the routes of the lines has a telephone in his home. The subscribers furnish their own poles, place them in position and the telephones are installed for $13. Thereafter the yearly expense is only $1.25 and this is for the repairing of the lines and maintaining of switchboards. Switchboards have been installed at Wadesville and Rockport and the lines have been extended all through the lower section of the country adjacent to the Jackson County line and as far as Lubeck and Mineral Wells, in the direction of Parkersburg.

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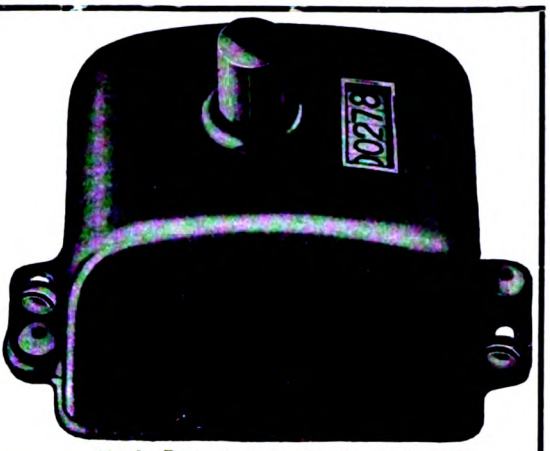

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WANTED—Experienced telephone men of good appearance and address as traveling inspectors for the Engineering Department. We need men to fill vacancies caused by recent promotions. Address George J. Yundt, Engineer, Southern Bell Telephone & Telegraph Company, Atlanta, Ga. 530

WANTED—Position as manager. I am not a technical man but a thorough business man; understand construction work in every detail, know what business is and how to get it; a master of details, quick and accurate in emergencies; thorough in system and discipline. Can "make good" in any position of responsibility where energy, fidelity and brains are needed and appreciated. Let me give you my experience and references. Address Box 533, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 533

WANTED—Continued

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WANTED—Position as manager of common battery exchange. Practical telephone and good business man. Have good record. Would not consider less than $100 per month. Address Box 526, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 526

WANTED—By a large telephone and switchboard factory, several young men not over twenty-two years of age, to enter its apprenticeship course, where they will be trained to install and operate large modern telephone switchboards. Address, stating age, experience and education, Box 503, care THE AMERICAN TELEPHONE JOURNAL, 116 Nasasu street, New York City. 503

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When you buy a "Columbia" you get an instrument that is right all the way through.
You don't get a piano finish on the outside and a scrap heap on the inside.
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We'd like to have you write us for prices, we are sure you will never regret so doing.
We will buy your old telephones and switchboards.

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TELEPHONE PATENTS

RINGER.

Elbert Rudolph Hobbs, Lamar, Colorado, patents (No. 809,060, dated Jan. 2, 1906; filed Nov. 10, 1904; serial No. 232,117) a ringer for telephones and the like.

In this invention means are disclosed for improving the mechanical arrangement and adjustment of the parts of a ringer so that without any auxiliary apparatus other than that incorporated in its design it may be made to serve for different signaling processes. Thus adjustments are provided for holding the armature ends equidistant from the poles and also for tilting one end nearer one pole than the other for selective or biased operation.

PARTY LINE SYSTEM.

Frank B. Hall and Arthur F. Poole, Wheeling, W. Va., patent (No. 810,335, dated Jan. 16, 1906; filed Sept. 23, 1901; serial No. 76,154) a party line system.

This invention consists of a means to selectively call any party on a line and to lock out all other parties but the one desired. At the exchange selective mechanism is provided which enables the operator to select and call the party desired. Of the two metallic lines leading to the sub-station one is legged to each instrument and the other is looped into the selective mechanism at each station, although normally open thereat. All sub-stations are provided with ground connections and through the medium of the bridged line and the ground return a subscriber can call the exchange. The operator secures the party desired by joining up the intervening open points in the looped side of the circuit up to and including that station.

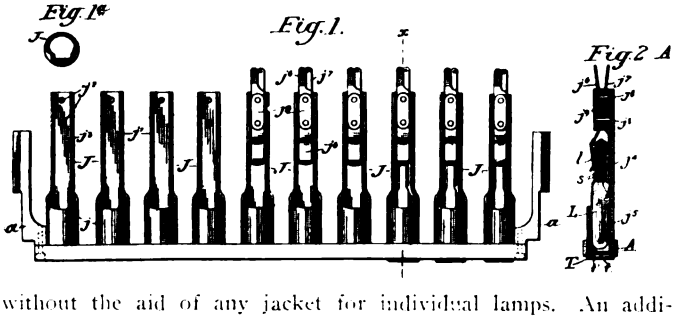
When a receiver is removed from the hook at any station that act automatically locks out all other parties on the line.

The limited space at our disposal will not permit us to fully describe the system and apparatus. All parties further interested in the matter should secure a copy of the patent from the Patent Office.

LAMP JACK.

Sidney A. Beyland, Elyria, Ohio, patents (No. 810,367, dated Jan. 16, 1906; filed November 25, 1904; serial No. 234,293) and assigns to the Dean Electric Company, Elyria, Ohio, a lamp jack for telephone switchboards.

In this invention there is disclosed a design for a lamp jack which will prevent cross illumination from one jack to another



without the aid of any jacket for individual lamps. An additional feature of the design lies in the adaptability of the socket to various methods of mounting, so that one form will be standard for all uses or purposes. Referring to the illustrations, *A* is a rigid front bar of metal which is employed to support the lamp sockets *J* in units of ten or more as desired. The portion of the jack *J* which fits into the supporting plate is formed into a tube which prevents cross illumination from one socket to another. The rear portion j^3 is flattened and has its edges j^4 turned upwards to form a channel. The springs j^5 j^7, together with the necessary insulating material, are attached to the socket by means of screws entering at j^2. The channel formation prevents the springs from twisting out of position and causes the lamp to be held in a secure position so that no portion comes in contact with the interior wall of the socket. This permits ventilation around the lamp bulb. Each jacket is provided with a fibre lining j^4 to prevent any accidental contact between the springs, lamp contacts and the socket.

TELEPHONE DIRECTORY.

Edward N. Lake, Chicago, Ill., patents (No. 807,942, dated Dec. 19, 1905; filed August 22, 1904; serial No. 221,687) a telephone directory.

This device consists of a form of directory which can be readily attached to a telephone instrument. Referring to the illustration, 3 is a bracket which is fastened to a rectangular

Fig. 1.

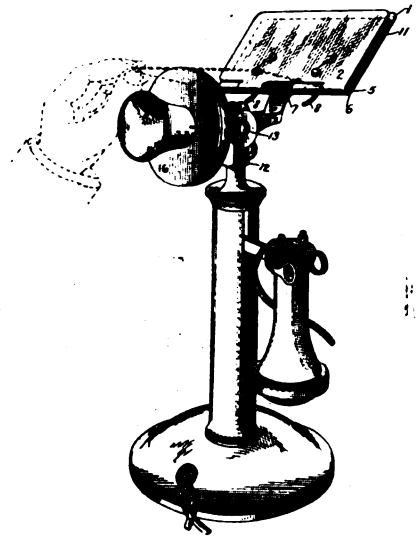


plate 1. This plate, together with plate 2, constitute the covers of the directory, the leaves of which are included and designated by the figures 11. These are held in place by means of semicircular guide rods 8, which pass through holes in the cards or leaves. The front cover is held closed by means of a spiral spring 7, which is carried by a rod which forms the hinge for the covers and is held in position by screw 5. The directory cards can be provided with indexing tabs for ready reference, so that in looking for a number it is only necessary to pull forward upon the indicating tab to disclose the number underneath.

TELEPHONE ATTACHMENT.

Paul Kammerer, Pittsburg, Pa., patents (No. 808,454, dated Dec. 26, 1905; filed Feb. 24, 1905; serial No. 247,126) a telephone attachment.

This consists of a standard or support for attaching a call registering device to a transmitter arm. A clamp in the form of an inverted U is provided with a vertical standard to which a register can be attached. The U formation is intended to be clamped over the arm, so that the registering device may be in plain sight of any person using the instrument.

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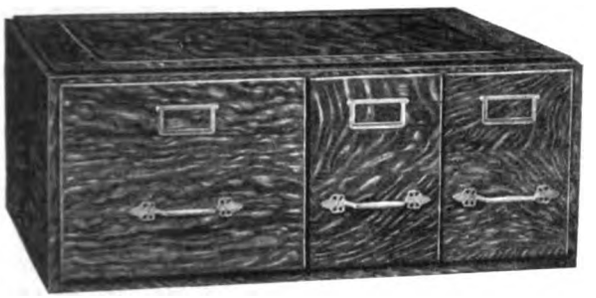

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TELEPHONES FOR RESIDENCE SERVICE.

IN telephones designed for intercommunicating purposes, means of securing instruments which shall be both compact and sightly have been given especial attention by the Connecticut Telephone Electric Company, of Meriden, Conn. Upon this page we show two of their well-known instruments. In Fig. 1 is shown a set known by catalogue number as 59 B, designed for residences, etc. This box is designed for the accommodation of a Connecticut automatic switch, having 10 buttons or less. The material used in its construction is either wood, brush brass or brass with a nickel finish. This instrument is to be used for communication between separate rooms in the same building, and arrangements are made for the use of a designation card opposite the button corresponding to each of the lines. The receiver hook is brought out at one corner of the case, while the transmitter is set with its working parts inside the case, only the mouthpiece and front plate being in sight. As the set can be readily placed within a recess in the wall it can be located in many places where it is especially convenient. This would make it available for many locations where a larger cabinet would be objectionable on account of lack of space. It will be observed that the entire set presents a very attractive appearance, and is no larger than is absolutely necessary for the use of a switch having working parts of sufficient size to be reliable.

The second illustration is another instrument designed for residence use, and is especially adapted to concealed work of the highest order. Although the switch is of the well-known Connecticut type, the arrangement is somewhat different from the other instruments. All working parts are fastened to a front plate, which is arranged to be set flush with the face of the wall. As the receiver is of the watch case type, and the gongs are very small, the amount of space in the room occupied by this instrument is inconsiderable. It is furnished with either a wooden plate, or a metal plate with brush brass or nickel finish. The sets are arranged for the use of switches with ten buttons or less.

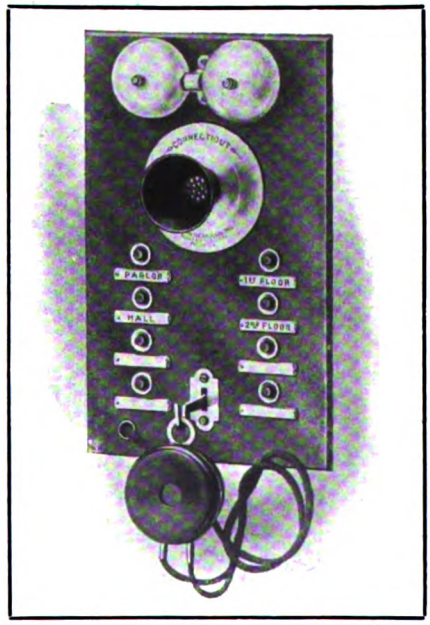

Fig. 2. Flush metal telephone, catalogue No. 54.

Both of these instruments are provided with the standard Connecticut switches, for which the manufacturers claim the highest degree of reliability. For residence use these two types of instruments, and the system of wiring used by the Connecticut company present numerous advantages which will be explained by the manufacturers upon receipt of a request for information.

THE ELECTRIC GAS LIGHTING COMPANY, Boston, Chicago, Toronto and San Francisco, is mailing a folder which illustrates two new types of switchboards for hotel and private branch exchange installations. One of these is called an "annunciphone" and is intended to take the place of a return call annunciator. It is provided with the usual needle indicator. Below are mounted two rows of jacks and sufficient plugs and cords are provided for intercommunication. The transmitter is mounted on the left of the cabinet, as is also the receiver hook. The other board is termed "Rotokoll" and conforms to the usual type of exchange switchboard of the desk type. The jacks and signals are mounted in alternate rows of 30 points each. A strip of jacks is provided for outside service and each pair of cords, of which there are fifteen, has double supervisory signals. The board illustrated has a capacity of 300 lines. On either side of the lower portion of the desk are four drawers, and the desk table is very convenient in arrangement. The transmitter is suspended in the usual way and a head band receiver is provided. This card will be mailed to parties interested and further particulars furnished upon request.

Fig. 1. Automatic flush type, catalogue No. 59 B.

A NEW WIRE MANUFACTURING COMPANY.

ANNOUNCEMENT was made on January 25th of the formation of the Electric Cable Company, of Bridgeport, Conn., which succeeds the Magnet Wire Company and the Peerless Electric Company, both of New York. The company is erecting a large model factory in Bridgeport, where it will manufacture magnet wire, field and armature coils and voltax, the new non-rubber insulation which is now on the market for the first time. The New York office will be at No. 42 Broadway.

The officers of the company are: President, Edwin W. Moore; vice-president, Frederick H. Cowles; treasurer, J. Nelson Shreve; secretary, H. S. Williston. The directors include G. Tracy Rogers, Binghamton, N. Y.; George C. Edwards, Bridgeport, Conn.; Russel A. Cowles, Edwin W. Moore, Frederick H. Cowles, J. Nelson Shreve, H. S. Williston, Alfred Skitt, John Carstensen, all of New York.

THE AMERICAN AUTOMATIC TELEPHONE COMPANY has recently filed its papers of incorporation at Albany, N. Y. The corporation is capitalized for $1,500,000, of which $500,000 is 7 per cent. accumulative preferred stock. Of this amount $650,000 was paid in at the time of the incorporation and since that time a considerable additional amount has been subscribed. The company will manufacture automatic switchboards and telephones. The officers and directors of the company are as follows: President, Senator John Raines, of Canandaigua; vice-president and general manager,

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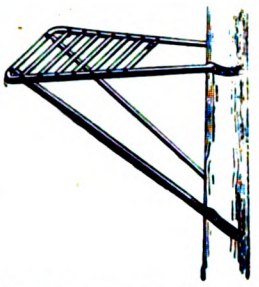

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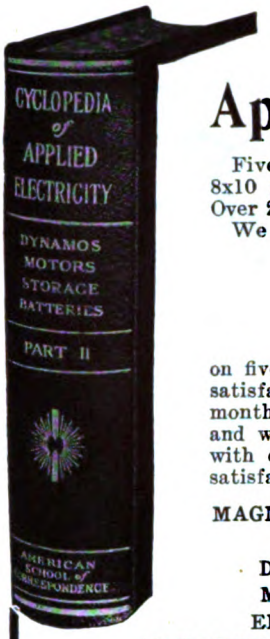

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CHICAGO, ILL.

Mention American Telephone Journal

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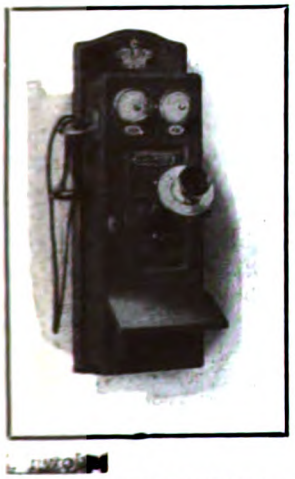
Because it acknowledges that the article copied is superior to anything that could be designed by the imitator.



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BULLETIN 36 T WILL TELL YOU ALL ABOUT THE BETTER TELEPHONES.

Ewing-Merkle Electric Company
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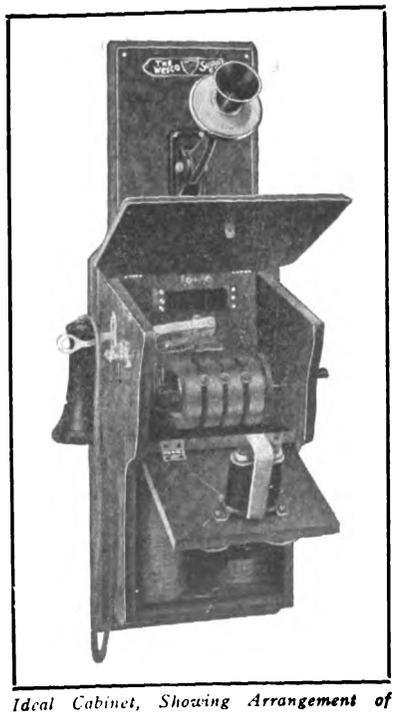
J. W. Lattig, one of the inventors; secretary and treasurer, B. J. Williams, President of the Shelby, Ohio, National Bank; Alvaro L. Thompson, of the firm of Ingmire & Thompson, Rochester, N. Y.; Henry H. Stebbins, Jr., a Rochester business man, and Joseph R. Webster and George R. Raines, of the law firm of Webster, Meade, Straus & Raines. J. W. Lattig and Charles L. Goodrum are the inventors of the system. The new company is now actively engaged in making arrangements for its manufacturing plant and is at the present time purchasing machinery, having its dies and punches made. It hopes to be ready to solicit business within a few weeks.

FASHION IN TELEPHONE CABINETS.

THE telephone has become so thoroughly a utilitarian device and so essentially an every day necessity in business as well as social life, that it would at first seem absurd to attribute to it any of the imaginative or real attributes that give value to a woman's spring bonnet or parosol. Nevertheless it is true that the elusive element of style or fashion has had a place even in the practical commercial field of telephone manufacture.

A few years ago it was quite a thing among Independents to boast of the ownership of an ornate tandem cabinet magneto telephone, and the longer the battery box and the more material used in its construction the greater was the pride of its owner.

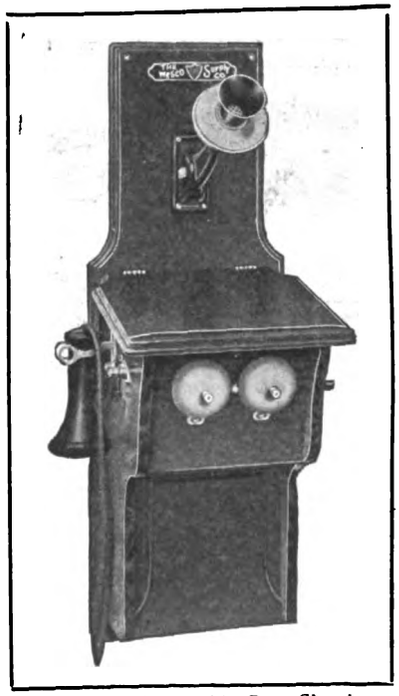
Then came the more practical wide battery box cabinet, so extensively used by the Bell Company and which still has a strong hold upon the fancy of a goodly share of operators and subscribers. Later the compact style cabinet made its appearance, the original design for which is claimed by half a dozen manufacturers and is to-day very widely used in the Independent field.



Ideal Cabinet, Showing Arrangement of Apparatus.

The "Ideal" cabinet is said to have been originally designed and placed on the market by the Wesco Supply Company, of St. Louis, several years ago, but it proved to be a "snow flower" born before its time. Since that time, however, several manufacturers have recognized the commercial value of this cabinet design and have made efforts to introduce it to their trade.

The accompanying illustrations show the "Ideal" magneto telephone as now placed on the market by the Wesco Supply Company. Among its advantages are the facts that the line terminals are inside of the cabinet entering from the rear of the backboard, thus placing these binding posts out of the reach of the user and avoiding the trouble so often experienced by patrons tampering with the line terminals. In this instrument all the wiring is done from the rear of the board and all the parts are firmly secured to the backboard, no shelves being used. Another point in its favor is that the transmitter arm is attached to the backboard, which gives it a solid base and avoids any tendency to vibration.



Ideal Cabinet, with Box Closed.

THE H. H. FRANKLIN COMPANY, Syracuse, N. Y., has recently issued a booklet which illustrates and describes the Franklin die cast process. This consists of casting a part complete, so that no machine work is necessary. All holes are accurate and threads correct. Any other method requires that the casting must be secured in the rough and machined afterwards. A special material, Franklin metal, is employed for this work, which has a fine grain and can take a high polish or a superior nickel plate. These castings can be made from other alloys as well as from aluminum. The dies used are accurate, indestructible, and are capable of producing any number of perfect finished parts. The Franklin process is intended for all small parts which require great accuracy in manufacture. Amongst the parts illustrated are gear wheels of all descriptions, pulleys, special movements, numbering and printing wheels, name plates, end-plates and bearings for telephone generators, etc. This firm also manufactures miniature models for advertising purposes, and is prepared to assemble and ship such apparatus complete. To parties interested in the manufacture of small machinery of any description this booklet will be found of much value. The company will be pleased to send it free and also give further details relative to its die casting process upon request.

INDEPENDENT CIRCUIT PATENTS UPHELD BY COURT.

THE United States Circuit Court of Appeals has recently handed down the decision in the suit of the Western Electric Company vs. the Galesburg Union Telephone Company, which suit involves the common battery multiple circuits known as the Fowler system, which is manufactured by the Sterling Electric Company, of Lafayette, Ind., the Sterling Electric Company having defended these suits. The case has been fought very bitterly for the past three years, the first hearing being before Judge Siemans, of Milwaukee, in the United States Circuit Court at Chicago, his decision being in favor of the Galesburg Union Telephone Company, or the Sterling Electric Company. The case was appealed to the United States Circuit Court of Appeals, where it was again bitterly fought, the Court handing down the decision January 26th, affirming Judge Sieman's opinion.

This is the last court of resort and the Sterling Electric Company makes the statement that so far as its common battery multiple system is concerned, it is the only manufacturer in the Independent telephone field whose patents have been adjudicated and affirmed and it is now in position to furnish users with a system that is free from any possible patent litigation.

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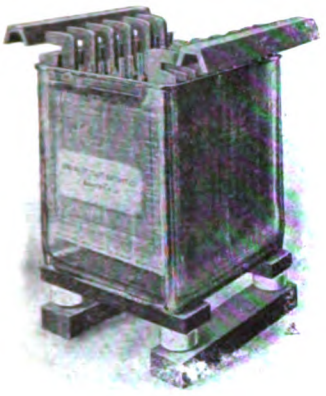

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When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

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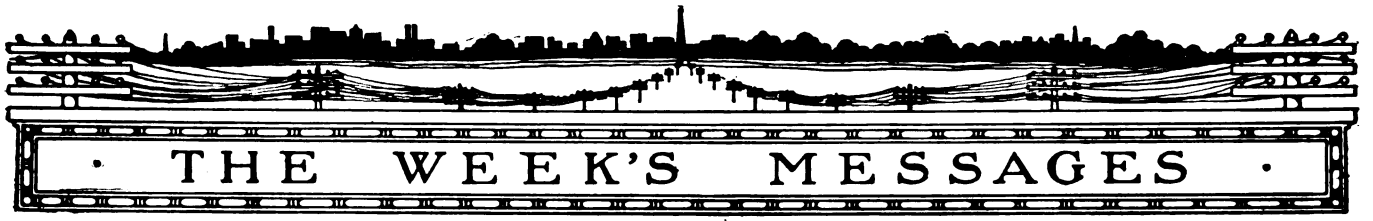

FINANCIAL.

SYCAMORE, ILL.—The DeKalb County Telephone Company has declared a quarterly dividend of 2 per cent.

BLUE EARTH, MINN.—The Blue Earth Telephone Company has declared a 6 per cent. dividend.

MEYERSDALE, PA.—The Economy Telephone Company has declared a dividend of 5 per cent. The company is to build a line from Pugh to Hooversville and from there to Johnstown.

FRANCHISES.

RIDOTT, ILL.—Mr. Shoemaker has been granted a franchise to build a telephone line in Ridott.

FULTON, N. Y.—Louis W. Emerick has been granted a franchise in Fulton. Mr. Emerick is to organize a telephone company, which will install a modern telephone system.

TUPPER LAKE, N. Y.—The Robinson Telephone Company of Pottsdam has been granted a franchise to build and operate a telephone system at Tupper Lake.

WAHPETON, N. D.—The Tri-State Telephone Company of Minneapolis has been granted a franchise at Wahpeton, and it is expected that Breckenridge will also grant the company a franchise.

GRANBURY, TEX.—The Hood County Independent Telephone Company has been granted a franchise in Granbury.

COMBINATIONS.

CARTHAGE, ILL.—The Mississippi Valley Telephone Company has acquired the Hancock-Houston Telephone System.

NEWPORT, IND.—The Hughes telephone exchanges at Newport, Dana, Hillsdale and Clinton have been consolidated. G. W. Hughes will be president and general manager; Mr. Horney, general superintendent. The name of the new company is the Indiana Telephone and Telegraph Company.

MORRICE, MICH.—The Farmers' telephone lines of Morrice have been united into the West Antrim Telephone Company. Officers have been elected as follows: A. L. Beard, Morrice, president; W. Waters, Antrim, secretary.

NEW PARIS, O.—The Bloom telephone system has been acquired by W. D. Rush. It is composed of two switchboards at New Paris, and lines extending into Richmond, Eaton, New Madison, West Manchester, Eldorado, Cedar Springs and Richmond.

ELECTIONS.

GIRARD, ILL.—The Farmers' Mutual Telephone Company has elected the following officers: President, E. E. Vaniman; vice-president, A. J. Brubaker; secretary, A. A. Neher; treasurer, S. O. Smith; manager, S. S. Brubaker; assistant business manager, H. R. Terry.

PEARL CITY, ILL.—The following officers were elected at a recent meeting of the Pearl City Mutual Telephone Company: President, D. L. Mitchell; treasurer, G. W. Dow; secretary, Henry Meyers.

SULLIVAN, ILL.—The Gays Mutual Telephone Company has elected the following officers: President, J. D. Hardinger; secretary and treasurer, Roy Wilson. The company is arranging for connections with the Sullivan Telephone Exchange.

CAMDEN, IND.—The Camden Telephone Company has elected the following officers: U. E. Tesh, president; E. A. McFarland, vice-president; J. H. Lesh, secretary; Monroe Martin, treasurer.

BLOOMFIELD, IA.—The Citizens' Mutual Telephone Company has elected the following officers: President, C. V. Carroll; vice-president, L. F. Christy; secretary, W. C. Durpie; treasurer, C. D. Evans.

ELDRIDGE, IA.—The Eldridge Telephone Company has elected the following officers: President, F. C. Gaghagen; vice-president, J. B. Crouch; secretary, M. H. Calderwood; treasurer, H. W. Bruhn.

ROLAND, IA.—The Roland Mutual Telephone Company has elected the following officers: President, Dr. E. Rice; vice-president, J. H. Larson; secretary-treasurer, J. H. Jondall.

ADRIAN, MICH.—The Adrian Telephone Company has elected the following officers: D. M. Baker, president; O. Hunt, vice-president; C. S. Park, secretary; G. A. Wilcox, treasurer; F. G. Tyler, manager.

MANKATO, MINN.—The Rapidan-Mankato Telephone Company has re-elected the following officers: F. O. True, president; George Ballard, vice-president; William Jamieson, treasurer; A. L. Viegel, secretary.

VIOLA, MINN.—The Viola Telephone Company has elected the following officers: John Bierbaum, president; George Wood, vice-president; H. A. Doty, secretary-treasurer and general manager.

OZARK, MO.—The Farmers' Rural Telephone Company has elected the following officers: Thomas J. Hanks, president; J. E. Bannett, vice-president; Grant Gooch, secretary; J. T. Deeds, treasurer.

WILTON, N. H.—The Wilton Telephone Company has elected the following officers: President, G. E. Bales; secretary and treasurer, W. H. Emerson; general manager, H. L. Emerson.

EAST MEREDITH, N. Y.—The Farmers' Exchange Telephone Company has elected the following officers: President, O. R. Munson, Meredith; vice-president, C. Burgin, Delhi; secretary and treasurer, J. G. Scudder, W. Meredith.

GREENE, N. Y.—The Greene-Coventry Telephone Company has elected the following directors: Albert Mead, G. O. Williams, P. E. White, H. F. Smith, William Wylie, Frank Drachler, Frank Preston.

ILION, N. Y.—The Herkimer County Telephone Company has elected the following officers: President, James Conkling, Ilion; vice-president, G. R. Fuller, Rochester; secretary, W. I. Taber, Herkimer; treasurer, C. H. Poole, Utica.

MIDDLETOWN, N. Y.—The Middletown Telephone Company has elected the following officers: Directors, M. C. Connor, Edwin Fancher, Galen Coleman, Daniel G. Comings, J. B. Hulett, T. B. Walsh, Charles A. Ketcham, W. C. Ramsdell and George B. Potter.

VAN WERT, O.—The following officers have been elected by the Van Wert Home Telephone Company: President, G. M. Saltzgaver; vice-president, W. G. Edwards; secretary, J. W. Longwell; treasurer, E. W. Leslie.

MORGANTOWN, PA.—The Conestoga Telephone Company held its annual meeting at Morgantown and elected the following officers: President, Henry Hertzler; manager and superintendent, Jacob Hartz; treasurer, Stephen Mast.

YANKTON, S. D.—The Yankton Telephone Company has elected the following officers: E. A. Bruce, president; W. H. Edmonds, vice-president, J. J. Wagner, secretary-treasurer.

SHEBOYGAN, WIS.—The Citizens' Telephone Company has elected the following officers: W. E. Tallmadge, president; Fred Karste, vice-president; Gustave H. Huette, secretary and treasurer.

NEW COMPANIES.

OZARK, ARK.—The Ozark & St. Paul Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are: C. B. Blaylock, Joseph Hill, S. Davis, J. A. Bateman, L. G. Bristow and others. The company will build lines in Franklin and Madison counties.

TOCSIN, IND.—The Tocsin Telephone Company has filed articles of incorporation. The company is capitalized at $10,000 and will operate in the northern part of Wells County, with home office in Tocsin. It takes over the business of a partnership having a large number of telephones in the territory. Extensions will be made and new equipment installed in the exchange.

POMONA, KAN.—An Independent telephone company has been organized at Pomona, and the following temporary officers elected: E. G. Swayze, president; F. E. Dyer, secretary and treasurer; Fred Baldwin and Carl Hoopes, executive committee.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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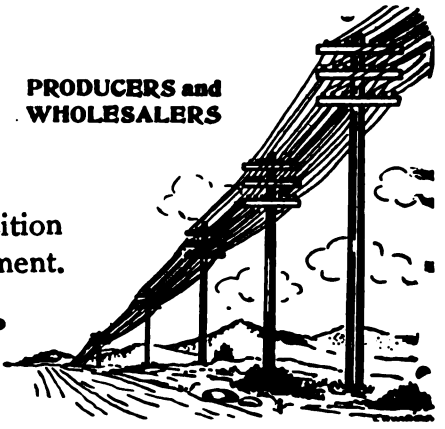
WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

"From the Stump to the Line."



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Upon a foundation of SQUARE DEALING we have built a pole business excelled by none. Our reputation is of more importance than your order, therefore if you buy from us, you will be assured of getting what you want.

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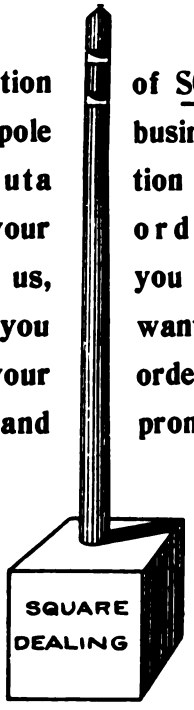

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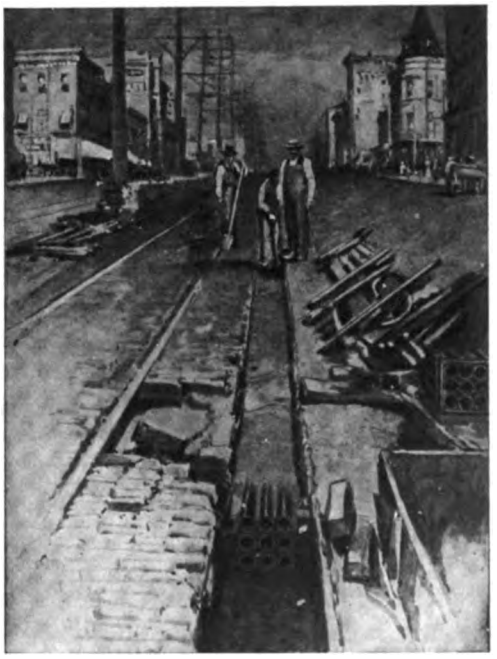

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THE WEEK'S MESSAGES

SALINA, KAN.—The New Cambria Telephone Company has been incorporated with a capital stock of $5,000.

CERESCO, MICH.—The Marshall Telephone Company, of Ceresco, has filed articles of incorporation. The capital stock is $1,000. The company will build a line from Ceresco to Marshall.

SHARON, N. D.—The Sharon Rural Telephone Company, Sharon, Steele County, N. D., has been incorporated with a capital stock of $5,000. Incorporators: I. K. Bakken, Oscar Barrett, Ole J. Vig, P. T. Duncan, A. Skadsdamen, Sharon, N. D.

POMEROY, O.—The Meigs County Home Telephone Company, Pomeroy, has been incorporated with a capital stock of $50,000. Incorporators: Arthur B. Kratz, C. E. Peoples, George Schwegman, O. A. Rowley and F. F. Stansbury.

COLUMBIA, OKLA.—The Dover & Columbia Telephone Company, of Columbia, has been incorporated with the following incorporators: A. Haughey, J. D. Crabtree and W. C. Ball.

DEER CREEK, OKLA.—The Deer Creek & Lamont Telephone Company has been incorporated with a capital stock of $1,200. The incorporators are: John W. Baker, of Lamont; S. R. Vincent and E. P. Webster, of Deer Creek, and B. W. Ritter, of Eddy.

PECKHAM, OKLA.—The Middleton division of the Peckham Mutual Telephone Company has been incorporated with a capital stock of $225. The incorporators are: H. S. Hook and Richard Sherbon, of Peckham; D. A. Johnson and W. J. Sherbon, of Wilbur.

WEATHERFORD, OKLA.—The Northwestern Mutual Telephone Company has been incorporated with a capital stock of $3,000. Incorporators: W. S. Wood and W. M. Coddington, of Weatherford; Joseph Wolverton, of Indianapolis, Ind. The company will build a telephone system throughout the counties of Custer, Dewey, Day, Woodward and Beaver.

EBENSBURG, PA.—The Farmers' Telephone Company, of Nicktown and Ebensburg has been organized with a capital stock of $5,000. The directors of the company are: A. B. Kirch, H. P. Plummer, S. H. Kirch, G. R. Edwards, Eli Jones, Stephen Griffith, John Griffith, Harvey Evans, Porter Davis, John Douglass, J. H. Lute and Harry Good.

LILY, S. D.—The Lily Local Telephone Company, of Lily, Day County, S. D., has been incorporated. Incorporators: B. P. Kortgard, H. H. Payne, O. K. Berg, H. E. Patterson and David Regneir.

GIATTO, W. VA.—The Crane Creek & Widemouth Construction Company, of Giatto, W. Va., has been incorporated with a capital stock of $10,000 to construct and operate telephone lines. Incorporators; W. C. Pritchard and J. H. Parrett, of McComas; Roger Martin, of Springton; Jairus Collins, of Bramwell, and R. D. Patterson, of Giatto.

EASTMAN, WIS.—The Western Crawford County Farmers' Telephone Company, Eastman, Crawford County, has been organized. Incorporators: James Fisher, J. F. Maney, J. R. Maney, G. H. Harvat and M. Lennehan.

PERSONAL.

E. D. CHIPMAN has been appointed manager of the plant of the Maquoketa Home Telephone Company at Maquoketa, Ia.

THOMAS CONNOR has been promoted by the United States Telephone Company to the position of manager of the office at Marion, O.

WALTER H. DREW, of Milwaukee, has been appointed district manager of Racine, Kenosha and Walworth counties, with headquarters at Racine, by the Wisconsin Telephone Company.

FRANK FERRIN has recently assumed the duties of manager of the Jones County Telephone Company at Monticello, Ia.

WILL H. MARTIN, of Green Bay, has been appointed manager of the De Pere exchange of the Fox River Valley Telephone & Telegraph Company.

P. S. STANDCLIFF, of Akron, has taken charge of the plant of the United States Telephone Company, at Milan, O.

MISCELLANEOUS.

ELKHART, IND.—The Home Telephone Company had a net increase of 356 telephones in Elkhart and Goshen during the past year. The company now operates 2,484 telephones and of this number 1,627 are in Elkhart.

GRAND JUNCTION, IA.—The Farmers' Mutual Telephone Company has completed its new exchange and already obtained 30 subscribers at this place.

ST. PAUL, MINN.—The Tri-State Telephone & Telegraph Company has recently cut over its new toll board in St. Paul. Attractive engraved invitations were sent out to a selected number of individuals, and guests of the company in this way were enabled to obtain a very satisfactory idea of the extent of the improvements involved in the change to the new switchboard. It should be a valuable factor in the promotion of the friendly relations which have existed between this company and its subscribers.

KITTANING, PA.—The Kittaning Telephone Company is giving toll connections to Leechburg, Vandergrift and Apollo over a new line.

New Construction in the Field

LEADVILLE, COL.—The Leadville Telephone Company is to build a line to Denver.

PAONIA, COL.—The Co-operative Telephone Company expects to extend its lines in Delta.

ALBANY, GA.—A new line is to be built from Prineville to Cascadia, at which place it will connect with the line to Albany.

PEORIA, ILL.—The Inter-State Telephone Company is to have a direct line through Peoria to Springfield.

SPRING VALLEY, ILL.—The Bureau County Telephone Company, with an exchange at Spring Valley, is to establish an exchange at Ladd.

MATTHEWS, IND.—The Matthews Telephone Company contemplates making further extensions to its lines.

NEW ALBANY, IND.—The Harrison County Telephone Company's lines are being extended to the Floyd County line near Georgetown, where they will connect with the system of the Home Telephone Company.

HAWARDEN, IA.—The Hawarden Telephone Company contemplates making many improvements and extensions.

CHANUTE, KAN.—The Wareham & Wood Telephone Company, of Chanute, is to place its wires underground.

ELLINWOOD, KAN.—The Ellinwood Telephone exchange contemplates many improvements in the spring.

OTTAWA, KAN.—The Ottawa Telephone Company is to spend between $30,000 and $40,000 in improving its plant at Ottawa.

SPINKS CORNERS, MICH.—The Spinks Corners Telephone Company is to build a line to Watervliet. A line will also be built south from Watervliet.

DEEP RIVER, MINN.—The Mesaba Telephone Company, of Mesaba, is to build a line to Deep River.

READING, MINN.—The Farmers' Mutual Telephone Company is to build a line from Reading to Rushmore. A number of other new lines are under consideration, and construction work will commence as soon as spring opens.

ST. JAMES, MINN.—The St. James Telephone Company is to build eight or nine farmers' lines.

WESELY, MINN.—The Wesely-New Prague telephone line is to be extended to Schieldsville, Lonsdale and New Market.

SPEED, MO.—The Independent Telephone Company is building a line to Boonville.

SANTA FE, N. M.—The Santa Fe Electric Telephone Company is to build a line from Albuquerque to Socorro.

FLAG, O.—The Boston Telephone Company is building a line to connect with the Stafford Company's line.

HAMILTON, O.—The Hamilton Home Telephone Company expects to spend $35,000 in improving its system.

MANCHESTER, OKLA.—The Eureka & Manchester Telephone Company expects to commence the construction of its line very soon.

GETTYSBURG, PA.—The United Telephone & Telegraph Company is to entirely rebuild its system at this place.

SHICKSHINNY, PA.—The Farmers' Mutual Telephone Company, which has extended its lines to Cambria and Rittenhouse, expects to build a line to Benton.

STROUDSBURG, PA.—The Slate Belt Telephone Company, which already has poles up between Portland and the Delaware Water Gap, will build a line to Stroudsburg.

MILBANK, S. D.—The Grant County Telephone Company is to spend $30,000 in extending and improving its system.

ROCKFORD, WASH.—The Rockford & Mt. Hope Telephone Line Company has applied for permission to construct and operate telephone lines on county roads near Rockford.

INDIAN NECK, VA.—The Indian Neck and Rappahannock Telephone Company proposes to build a line to Stevensville.

BRIDGEPORT, W. VA.—The Bridgeport Telephone Company is to extend its lines to Bushy Fork.

SHEBOYGAN, WIS.—The Citizens' Telephone Company, of Sheboygan, is to spend $30,000 in improving its system.

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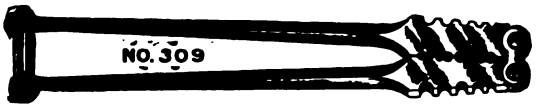

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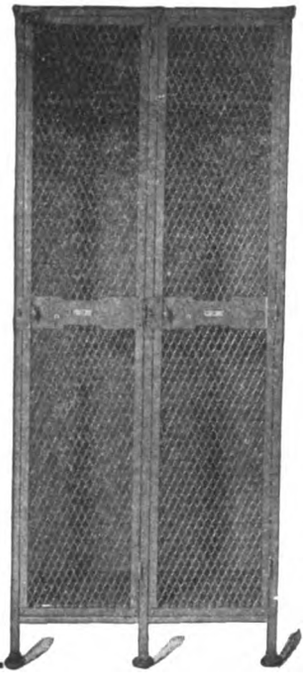

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needing large lists of supplies are advised to communicate with The American Telephone Journal, if they wish to save money.

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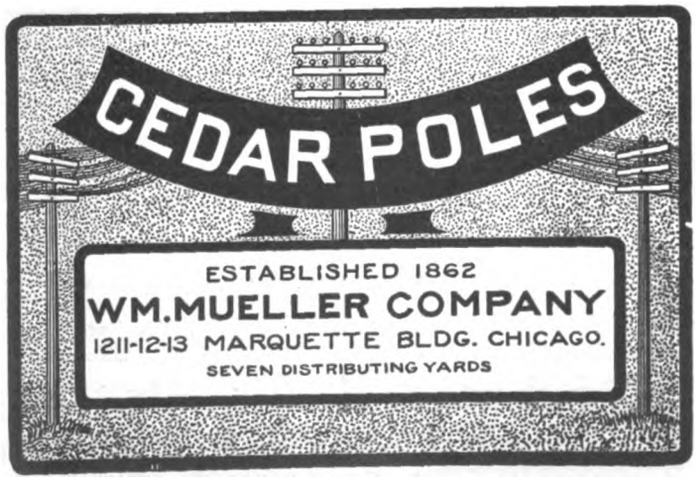

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are poles that are impervious to moisture. They don't grow that way but have to be treated with a creosote compound which expels all the inherent moisture and protects the exterior from the action of ground rot.
Our business is preserving poles by this process. It is not expensive, and when the life of a pole is increased indefinitely by our treatment, don't you see where you can save money by writing us for prices?
We will preserve your poles or sell you poles already treated. Write for booklet.
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THE CORD THAT LASTS.

This cord consists of two steel piano wires covered with a spiral of fine copper wire. The cord is then insulated with a silk and cotton insulation and each conductor is covered with a cotton braid, one of the conductors having a red tracer so as to distinguish it from the other. The conductors are then formed into a spiral and covered with a heavy, waxed, gray Gilling Thread.

"EACO" STEEL SWITCHBOARD CORD

will outlast anything on the market. Write and get prices, and when doing so state what make of switchboard you are using.

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You don't have to thaw the ground. DRIVE a D. & T. Anchor THROUGH THE FROST. TWIST it UNDER the frost. We guarantee them to operate through TWO FEET OF FROST.

NOTE the V shaped eye. That is what does it. Ask your jobber or write

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Approved and listed by the NATIONAL BOARD OF FIRE UNDERWRITERS.

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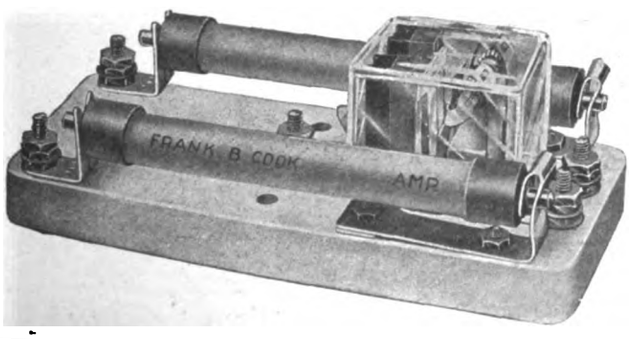
Absolutely protects your instruments against lightning and against both strong and sneak currents.



Ask for Type B4.

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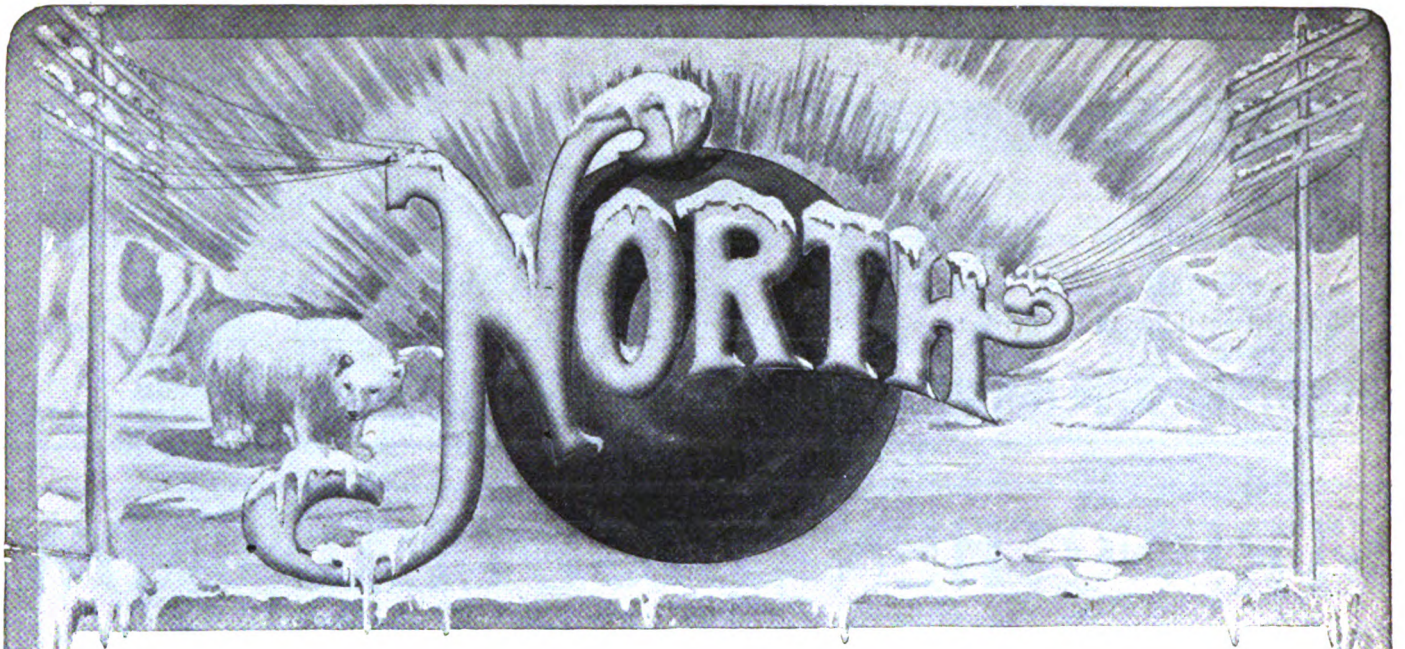

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COMMON BATTERY TELEPHONES

The hinged front of "NORTH'S" common battery wall type telephone renders the condenser and instrument wiring accessible without removing from the wall.

The cabinets are not veneered, but every stick of lumber is from a veneered mill; for they handle nothing but the most beautifully figured woods. The stock is 18 months old, kiln dried 30 days and given a hand-rubbed finish involving 7 processes.

They are equipped with the following standard parts, and will operate on any standard common battery system.

"NORTH'S" Solid Back Transmitter that combines ample volume, perfect articulation, deep penetration and natural pitch.

"NORTH'S" Permanently Adjusted Receiver. The diaphragm does not rest on the outside shell, but on a bell-shaped metal seat—it isn't thrown out of adjustment by unequal expansion of hard rubber and magnet metal.

"NORTH'S" New Ringer, provided with a knife-edge, weighing-scale bearing armature—it can't tighten or drop out of place.

"NORTH'S" Horizontal Lever Adjustable Tension Switch-hook with long flexible contact springs—they can't break or become misplaced, and always resume their normal positions.

The parts are individually tested—the transmitter by an engineer. There are two inspections during assembling, a final test on completion and again a test before shipping—just to make sure.

CHICAGO **CLEVELAND** DALLAS

THE
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CENTURY
100% GOOD

OUR MAGNETO DROPS

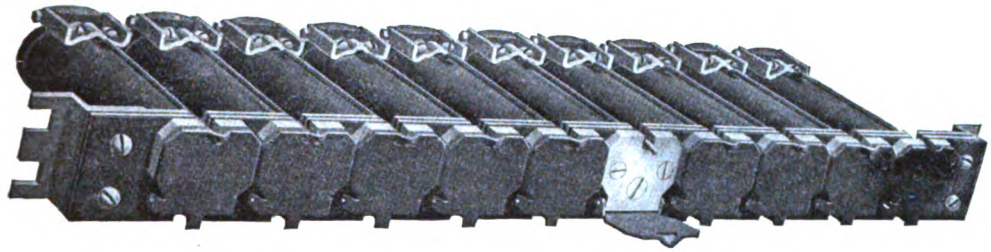
are mounted ten on a strip,—separate from the jacks

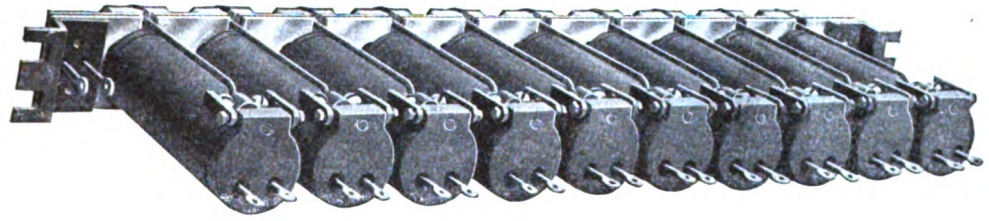
Any drop can be removed by taking out one screw from the front.

The drop coils are enclosed in an iron tube. This tube is made of high grade Norway iron, electrically welded.

The Tube and Armature are copper plated and lacquered.

Only silk covered wire is used in winding the coils, the wire being the largest size that can be used to obtain the required resistance.





Night bell contacts on our drops can be relied upon at all times. The back plate of the mounting strip is one side of the night bell circuit and the shutter strip is the other side. The shutter in falling, comes in direct contact with the back plate, enclosing the circuit.

Let us quote you prices on your new magneto switchboard. We will send sample parts for your inspection.

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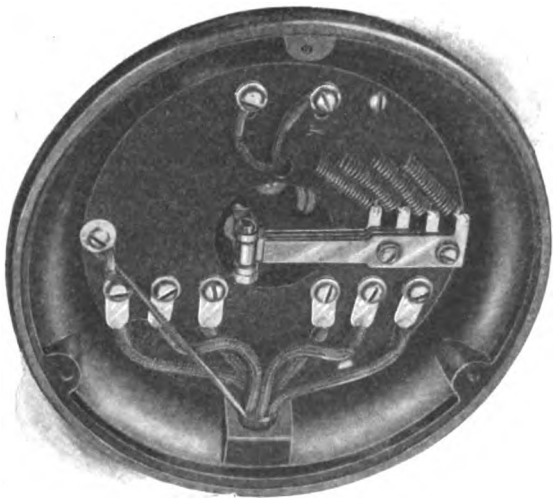
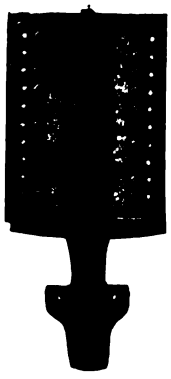
MONARCH APPARATUS

THE DESK SET



All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 10-16 SOUTH CLINTON STREET CHICAGO, ILL.



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HALL CABLE TERMINAL

you have bought protection against lightning, sneak currents, or crosses with dangerous circuits. The "getatability" of the Hall is unique. When the cover is taken off the top, bottom, front and back are exposed. No opportunity here for faulty inspection.

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Rigidity? An all-metal framework carries the terminal plate. We couldn't make it stronger if we tried.

Seems to us you ought to get prices. Your name and address will bring them, and some more facts that will be of value to you.

THE MOUNTAIN STATE ELECTRICAL COMPANY,

Sole Manufacturers, WHEELING, WEST VIRGINIA.

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"There Must Be a Reason"

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The best testimonial we have to offer is that this originality has in a great measure caused our business to grow to its present mammoth proportions—business from buyers who demand the best regardless of cost.

Our prices are reasonable, therefore it will pay you to try the celebrated Dean product in your new year's construction.

THE DEAN ELECTRIC COMPANY
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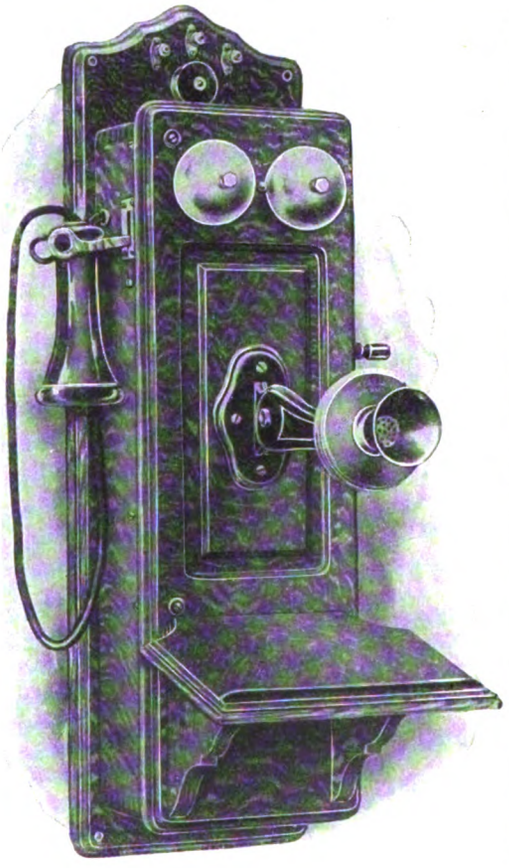

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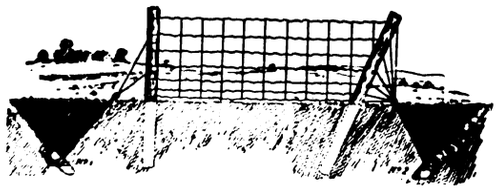

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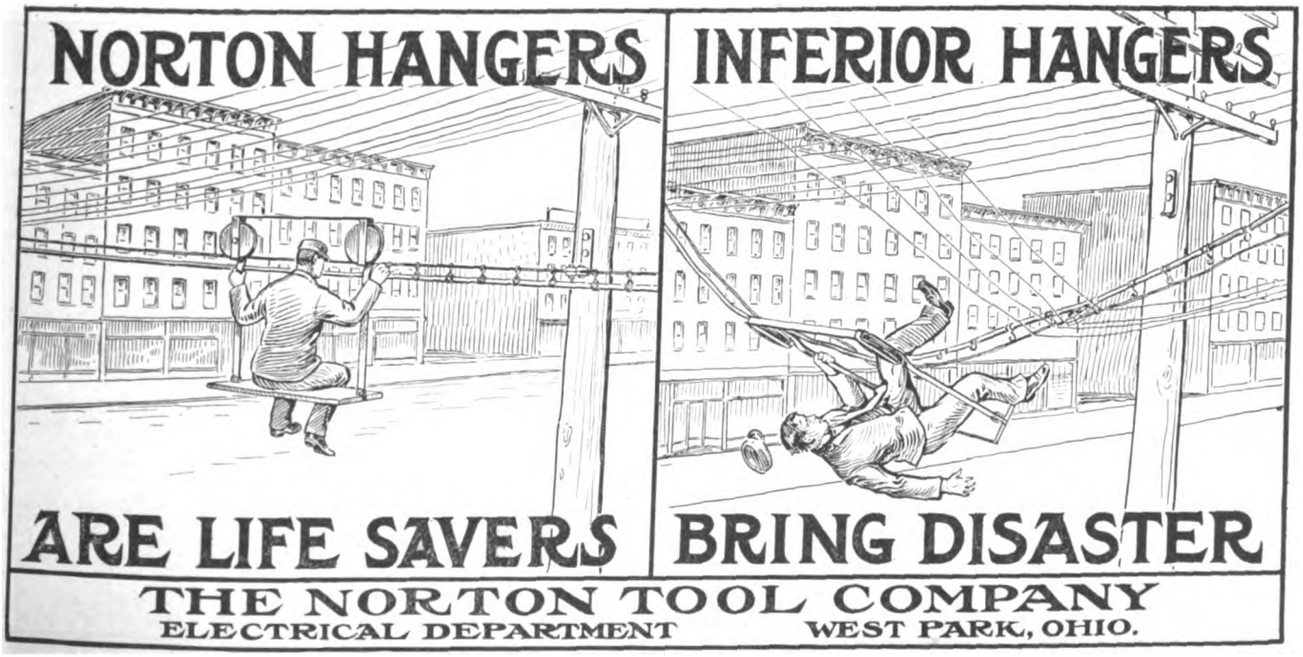

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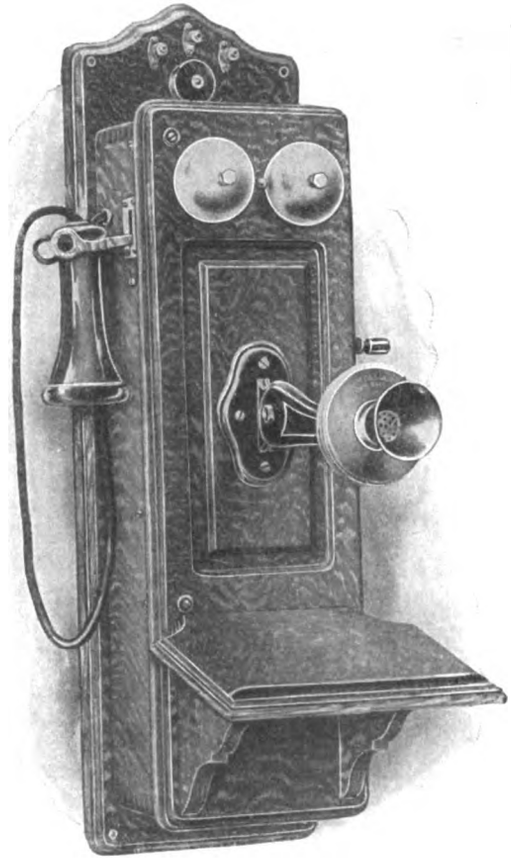

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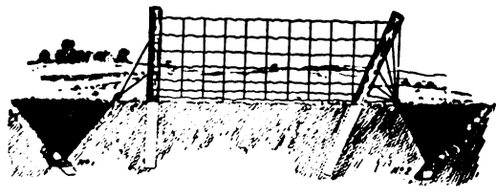

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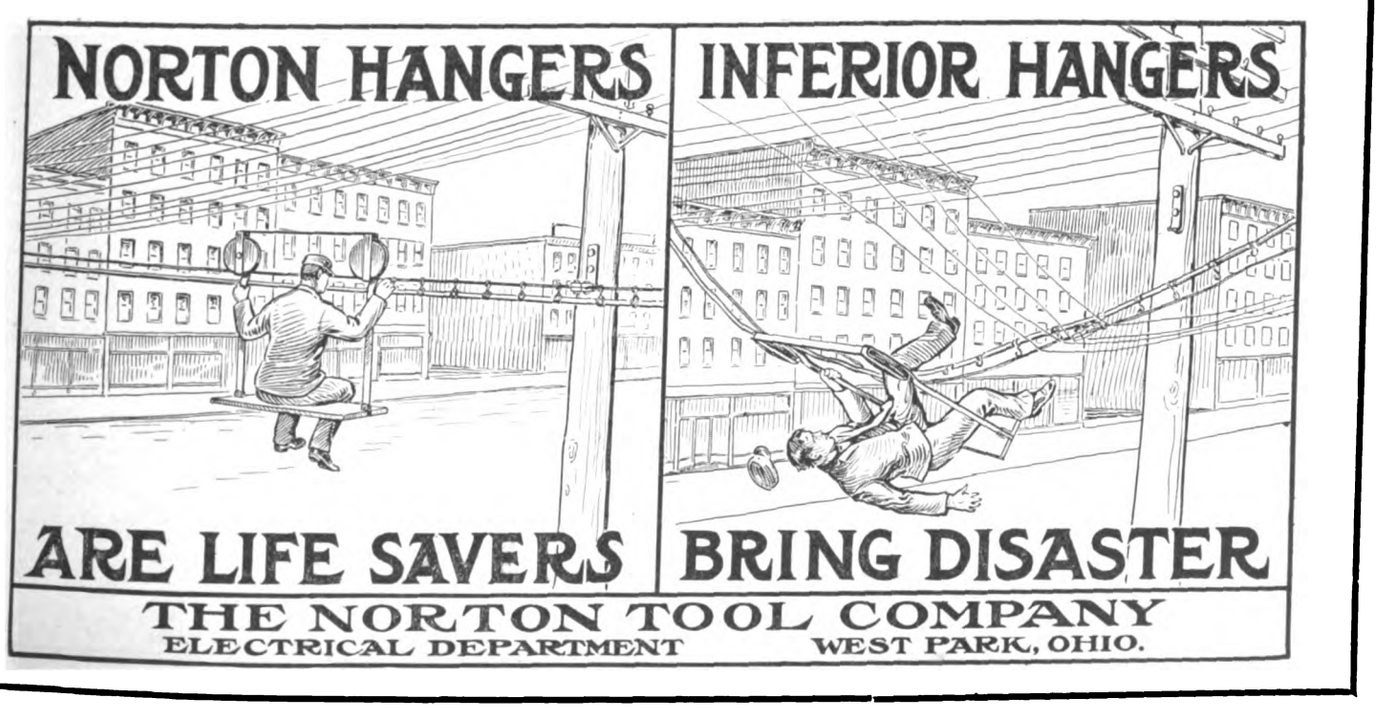

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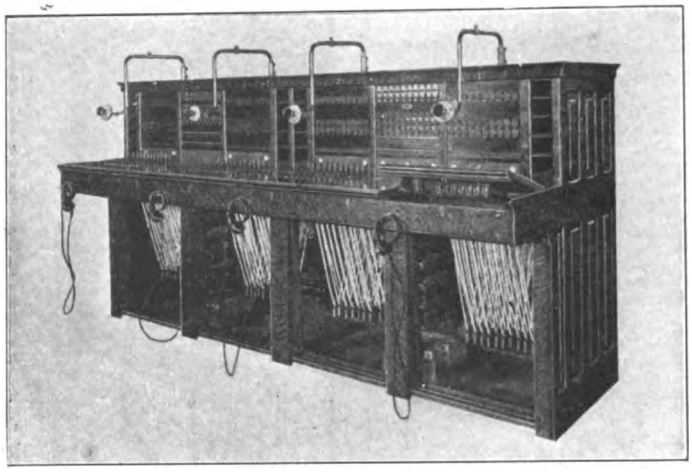

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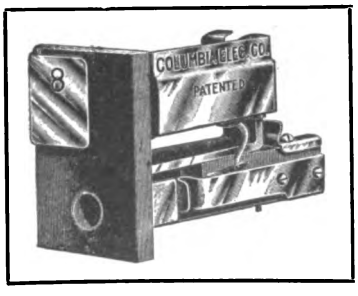

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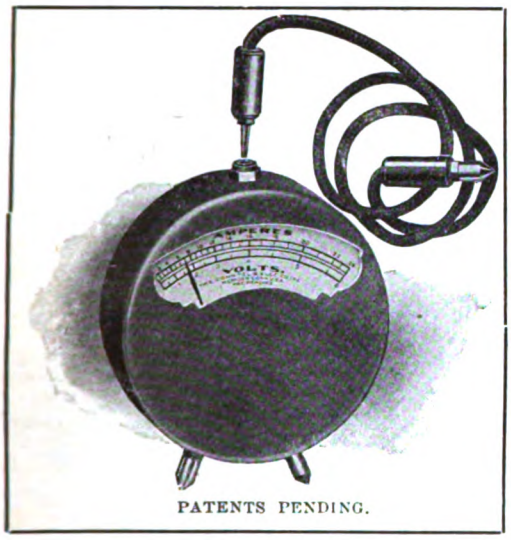

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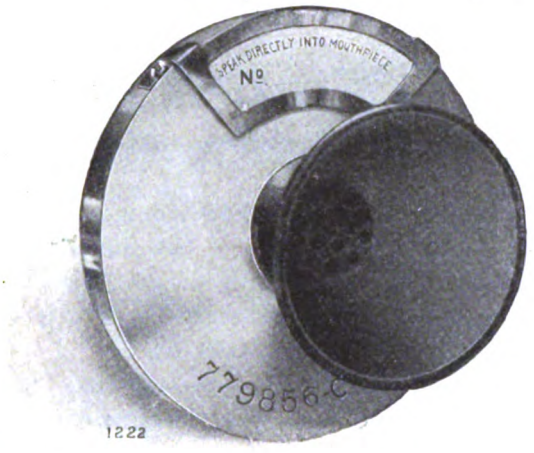

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is decidedly different from any other you have ever seen. If you were to try it on a long distance line, then you would notice the difference---that counts.

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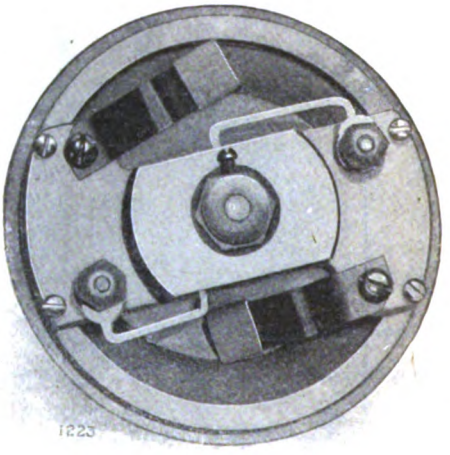
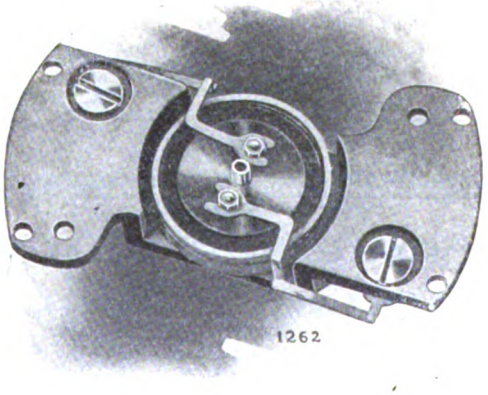


TRANSMITTER With Back Removed



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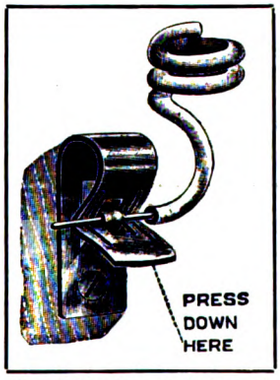

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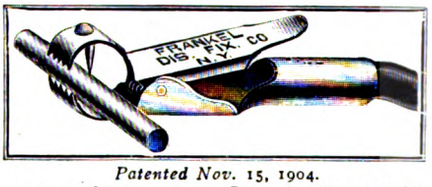

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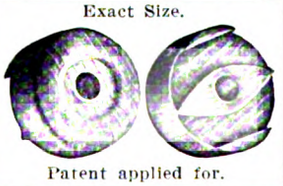

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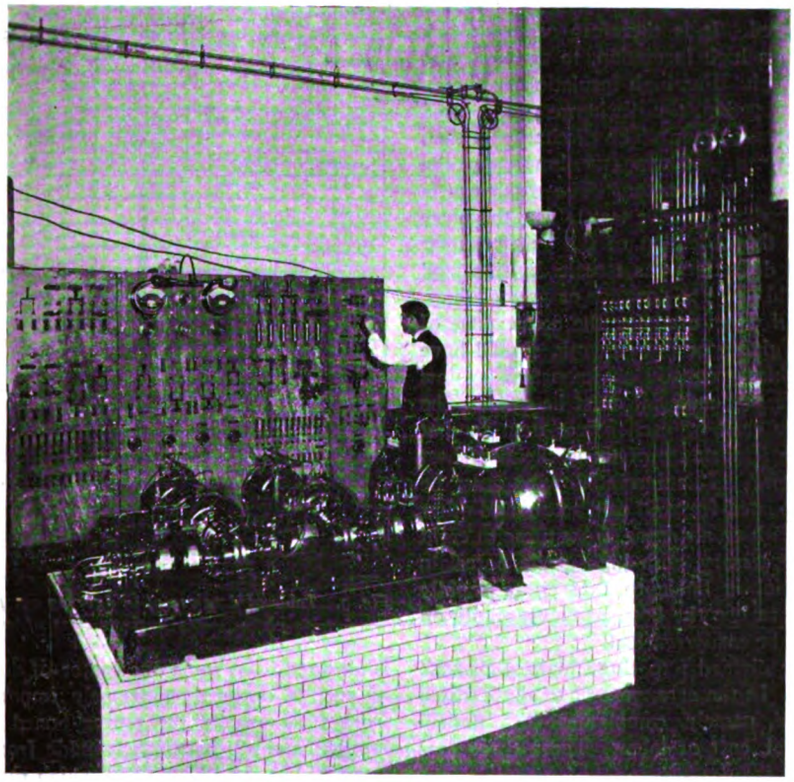
Power Data for Telephone Men

By P. Kerr Higgins.

TELEPHONE companies often expect the inspector to do his own electric wiring and in large exchanges to supervise and in some cases take charge of the wiring of the entire building, and the man who once was expert in telephone matters only, is now expected to be posted on lighting, power and wiring. It is here assumed that the average telephone man is familiar with the general principles underlying electricity and magnetism. However for the benefit of those who may be rusty along this line, and especially in the rules and tables relating to motor work, circuit loads, wiring, etc., this ground will be gone over in a general way so as to introduce and explain the various terms which may be unfamiliar to many.

Electricity may be divided into three great divisions: (1) Static; (2) Dynamic; (3) Voltaic. In telephony, as in no other active branch of science, we come in contact with electricity in almost every form, hence in the author's opinion it is only a question of time when the telephone engineer will of necessity take rank with the best of electrical engineers.



Switchboard for Controlling Current for Actuating Apparatus in the Exchange of the Citizens' Telephone Company, Grand Rapids, Mich. Machines for Supplying Ringing Current Are Mounted Upon the Pier in the Foreground, and the Switches Which Control These Machines Are Placed Upon a Special Panel Shown at the Right of the Machines.

It is true he will not be called upon to handle, construct or possibly use the immense machinery used in electric lighting or street railroad work, but he will nevertheless be expected to know much of their principles, methods and circuits. This is obvious even now when the high tension systems become grounded and pump into the telephone lines inductive disturbances which paralyze the business while they last. It can also be seen in electrolysis, which plays such havoc with our cables, more and more of which are being used every day. If the telephone engineer does not understand the cause, how can he apply the remedy? Only by being dependent upon others for information which should be his very own. The demand for knowledge in telephone men of all classes is becoming greater every day, and with new systems, new methods, auxiliary apparatus and larger exchanges this condition will continue and grow more imperative.

In considering the sources of supply we find two kinds of current furnished, sometimes alternating, sometimes direct, and, in the larger exchanges, both. The voltage may be 500, 220 or 110. In some exchanges current at 104 volts is supplied.

The supply wires are usually put in by the company furnishing the power, but the leads from the meter to the power board and to the machines must be of the proper size, for if not there will be either waste of energy or damage to apparatus. We will therefore consider some of the rules governing this branch of the work. The prime consideration in all wiring is the proper laying out of the circuits, and the same rules will apply to telephone power that would to electric lighting.

In order to have wires of the proper size one must know the laws of resistance, drop of potential, etc. In measuring resistance, the Wheatstone bridge method is familiar to every telephone man and consists of the familiar figure of a base line on both sides of which are two triangles, as shown in Fig. 1. Connected up in series with the base line is the detector which may be a galvanometer, a lamp, or a receiver. Now when the values of resistances composing the arms of the bridge are according to the proportion A : B = C : X, a balanced condition is the result, in which no current passes through the galvanometer. Three of the arms may be made variable. If adjusted to bear a definite relation to each other, X may be an unknown quantity represented by the line or apparatus under test. The arms are then adjusted to find a balance, and the resistance in C will represent the resistance of X, provided A and B have equal resistance, or if unequal then $X = B \times C \div A$. It is possible to use lamps and form a bridge which proves very interesting, instructive and useful. The principal feature to remember is that the ratios must be A : B = C : X, and such a bridge with

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known resistance of fixed quantity will prove very serviceable in testing wires, armatures, field coils, etc. The method of making a resistance test is shown in Fig. 1*a*, *b*, tables of resistance Figs. 3 and 4. The resistance of a lamp varies, being nearly twice as much when cold as it is hot. The resistance can be found by dividing the voltage across the lamp terminals by the number of amperes flowing through the lamps. The insulation of wires may also be tested in a like manner by freeing one end of the wire

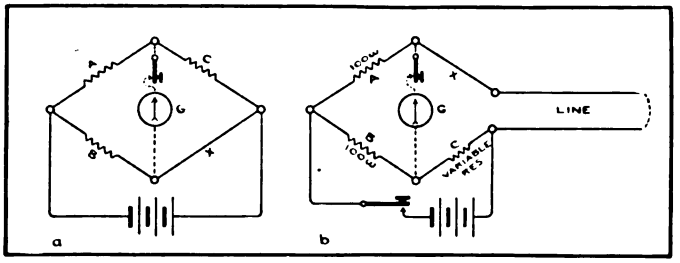

Fig. 1. Conventional representation of Wheatstone Bridge circuits, showing method of connecting unknown resistance.

under test and grounding the binding post from which it was taken off the bridge. This insulation is the opposite in effect of specific conductor resistance, in that as the wire is increased in length the insulation is lowered. It is therefore necessary for every foot of wire to possess a high insulation, to the end that the general average may be high. For high insulation tests, say over one million ohms, one megohm, the discharge test is used with a sensitive reflecting galvanometer. The discharge is then taken through a known resistance (say 1,000,000 ohms), and the deflection on the galvanometer needle noted. The discharge is also taken with the line or apparatus under test taking the place of the known resistance and the deflection of the galvanometer needle noted, then if the first deflection was 1 scale division, and the second 50, the result would be 50 × 1,000,000 or 50 megohms.

It is very important that all wires used for the conveyance of power, whether for electric lighting or power work, should have the very best insulation. This is equally as important as low resistance and to this end the best material must be used. The underwriters' rules should be read by each power man so that he may know and realize the importance of using the very best grade of rubber insulated wire. This insulated wire must be supported and thoroughly insulated from all conductors and other material and be surrounded with an air space, from three to eight inches, and fastened, when necessary, with high grade porcelain insulators. Insulating material is liable to deteriorate rapidly and it is therefore necessary to use the best, more especially on concealed work which cannot be easily reached.

All wiring systems may be divided into three main divisions: Mains, feeders and branches. In the arrangement of these, three things have to be considered, namely, compliance with underwriters' rules, cost of material, cost of labor. These three fac-

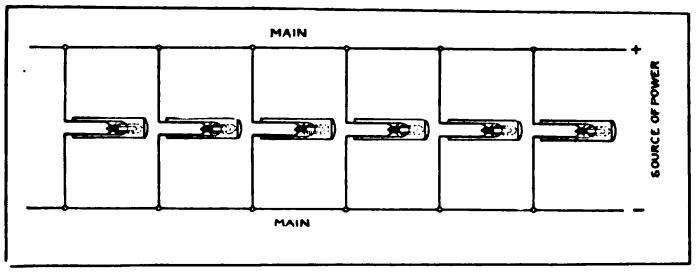

Fig. 2. Arrangement of circuit when lamps are connected in multiple.

tors determine how the work must be done. The first includes one requirement to be considered above all others, which is the amount of drop taking place in any one circuit.

The cost of material is always known, hence the object of the wireman is to so lay out his work as to keep the labor bill down to the minimum without a corresponding needless expense in material. In adopting one of two possible ways, if the material cost in both is equal, then the labor cost decides. If the labor is the same in both the copper will decide the best course to adopt. To find the drop, the following rule is very helpful: If the full drop permissible is 3 per cent., then an arbitrary drop of 1 per cent. may be considered, which at 110 volts = 1.1 volts. The circular mils required are then amperes × feet (both wires) × 11 ÷ the drop. The arbitrary drop is that decided upon by the underwriters, contractor, or inspector and is usually from one to two per cent. If a drop takes place it is due to resistance and amperage, and this with proper insulation forms the foundation of all electrical wiring, whether for telephone power uses or for motors or for electric light. It is then oftentimes both economical and wise to use two sets of mains instead of one large set, and here is where the judgment of the wireman or engineer is seen to the best advantage, also in the arrangement or division of the drop throughout the entire system. In all systems the margin (especially on large work) should not be too close, enough being left for what is usually termed the overload, especially in the mains.

Before any wiring is done for any purpose it will be found time well spent to draw up, tabulate and arrange the distribution showing the drop permissible; size of wire, as calculated; voltage; amperage; length of mains, feeders and branches; number of outlets; detail of outlets, whether for motors, lights, charging of accumulators, etc., and amperage taken for each. Where much conduit or moulding work has to be done it is well to have the wire of a size which will permit the same size moulding or conduit being used for all work, especially the branches. Wiring

SIZE OF WIRE B.& S.	RES. PER 1000 FEET	DROP PER 1000 FEET PER AMP.	POUNDS PER OHMS	CIRCULAR MILLS	AMPERES ALLOWABLE CONCEALED	AMPERES ON OPEN WORK
0000	.04893		13090	211.600	218	310
000	.06170		8232	167.800	180	260
00	.07780		5177	133.100	150	220
0	.09811		3256	105.800	125	185
1	.1237		2048	83.690	108	156
2	.1560		1288	66.370	88	131
3	.1967		810	52.630	75	110
4	.2480		509.4	41.740	63	92
5	.3128		320.4	33.100	53	77
6	.3944		201.5	26.250	45	65
7	.4973		126.7	20.820	38	52
8	.6271		79.69	16.510	33	46
9	.7908		50.12	13.090	28	38
10	.9972		31.52	10.380	25	32
11	1.257		19.82	8.324	20	25
12	1.586		12.47	6.530	17	23
13	1.999		7.84	5.178	15	18
14	2.521		4.93	4.107	12	16

SAME AS RESISTANCE PER 1000 FEET

Fig. 3. Table of data useful in figuring out proper dimensions of leads for a given class of work.

is all done from some one center of distribution, and the selection of such a center is extremely important. In telephone power work it is usually the power board to which the mains are brought and all distribution made from that point. A back bone is created in the mains from which radiate all the branches. This main distributing lead usually takes the form of copper bus bars, to which are attached fuses for each circuit of a capacity corresponding to the safe load which the branch is supposed to carry. All the fuses should be plainly marked, and in no case should the fuses be "jumped" by wires. As soon as the fuse is "blown" another, of the same size, should be put in.

Two methods of wiring are to-day in common use by supply companies. These are the two-wire system, and the three-wire system. The two-wire system permits of only one pressure, usually 110 or 104 volts. The three-wire system permits of two voltages, 110 or 220. This is very convenient in that both motors and lamps may be used on one system. It is of course true that this could also be done with a voltage of 220 by using two lamps in series, but is undesirable for many reasons. The three-wire system then represents a saving in copper as can easily be proved by any one by applying the following rule to any case under consideration:

$$\text{Circular mils} = \frac{\text{feet of wire} \times \text{amperes} \times 11}{\text{drop in volts.}}$$

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Take for example 30 lamps (each one half amp.) on a two-wire system at 110 volts = 15 amperes, length 100 feet, would necessitate:

$$\text{Size of wire} = \frac{200 \times 15 \times 11}{.02} = 16{,}500 \text{ circular mils.}$$

In a three-wire system the size would be:

$$\frac{200 \times 7.5 \times 11}{2} = 8{,}250 \text{ circular mils.}$$

The quantity 11 is the approximate resistance of one mil foot of copper wire, for example, a copper wire one foot long and one circular mil cross section. If the number of feet of wire is constant then the resistance is inversely proportional to the cross section, so that if the resistance of 1,000 circular mils be 11 ohms then 10,000 mils = 1.1 ohm, hence the resistance is only one-tenth while the circular mils are ten times.

In the two-wire system two wires of 16,500 C. M. were necessary; in the three-wire system two wires of 8,250 C. M. The third wire carries only the surplus current of one side of the circuit above the other, which is almost nothing in a well balanced system. A system having an equal number of lights on both sides will in no case make the third wire carry more than a half an ampere represented by one lamp, as the next lamp would be connected up on the other side and so restore the balance if all the lamps are lighted. It is customary, however, to run all three wires of same cross section. In this case the amount of wire would be represented as follows:

Two-wire system, $16{,}500 \times 2 = 33{,}000$ circular mils. Three-wire system, $8{,}250 \times 3 = 25{,}750$ circular mils.

The saving is 7,250 circular mils, or a saving of about 25 per cent. In the three-wire system the two outside wires usually represent 220 volts and the circuit used for motor work. The difference in potential between one of the outside wires and the middle or common wire is 110 volts and this circuit is used for lamp work. The cross-section in circular mils represents the square of the diameter of the wire in mils (thousandths of an inch), and it is customary to consider wire in this way, although up to No. 0000 we frequently use the Brown & Sharpe or some other standard gauge. If the size is given in mils this must be multiplied by 100 to give circular mils. The foregoing rules will serve to show a net saving in favor of the three-wire system, but the system must be kept balanced to accomplish the aim in view, for the reason that all the consumers are by no means likely to use the light at the same time. There is ever present an unbalanced condition and this has had its effect on the full adoption of three-wire system, but is much exaggerated by the average electrician. While theoretically the three-wire system is always in an unbalanced condition, it represents a saving and is much more convenient, as a rule, than the two-wire system, especially in a commercial circuit where the power is used for other purposes besides lighting. In private installations where the city current supply is used, it is almost essential to have the building wired on the three-wire system. In order to find the loss or drop in volts on any circuit use the following rule:

Volts drop = current × resistance.

If a wire is carrying a current without loss there will be absolutely no heat produced; if, on the other hand, loss is present (owing to an overload) then heat is present and may be enough to melt the insulation, in which case there is danger of fire. Inasmuch as we measure the current consumed in the use of the electric light in watts, we then must also measure loss through heat in the wire in watts, hence:

SIZE OF WIRE B. & S.	LENGTH	AMPERES	RES. OHMS	DROP IN VOLTS
10	1000 FT.	10	1	10
10	2000 "	10	2	20
10	3000 "	10	3	30
10	4000 "	10	4	40
10	5000 "	10	5	50

Relation of Drop to the Current and Resistance of Standard Section of Wire.

Loss in watts = volts lost × amperes.

Or we may use another method:

Loss in watts = square of current × resistance.

And the horse power lost = 746 ÷ watts lost, since 746 watts is the equivalent of one horse power.

The higher the amperage, the greater the loss, the lower the amperage, the smaller the loss. The loss also increases as the number of wires are increased. The ratio in the first instance being 4 to 1 with double the amperage. Hence the best practice is to increase the voltage and keep down the amount of current.

To observe in practice the drop through a given piece of apparatus, in a lamp, for instance, bridge around the lamp a voltmeter, and the reading will show the loss of potential. It is very apparent from this figure that a loss in pressure has resulted and is in proportion to the resistance introduced. If we know the voltage and the amperage the resistance of the lamps can be found by dividing the voltage by the amperage. If we know the voltage and the resistance of the lamp then amperage = voltage ÷ the resistance of lamp.

(To be continued.)

The Financial Side of the Telephone Business

By Harold D. Stroud.

THE telephone business is one that, of all public service institutions, has been slowest to respond to the dictates of sound finance, yet the fact that it has prospered in spite of this is sufficient reason to show for it great possibilities in the future, as well as to commend it to investors at the present time, provided that the plan of selling the service is rational.

In stating that this business is not based upon sound finance, the writer refers to the conclusion of a committee of the Merchants' Association of New York City, appointed to investigate into the rates and service of the New York Telephone Company. In their work they were assisted by the New York Audit Company and Westinghouse, Church, Kerr & Company, the former to go over the accounting methods and the latter to report on the methods and apparatus for making the service charges.

The conclusions of this committee, which was composed of some of the best men of New York, was summed up in the following words:

"It is the opinion of this committee, therefore, that in large cities the flat rate with unlimited service is based upon a fallacy. That it is extremely unjust to small users, favors large users, unduly impedes expansion of the telephone business, tends to inefficient service, and as a business proposition, it is unsound."

The unquestionable character of the committee and its experts is such as to indicate to fair minded people that the conclusion is a true one, unbiased by selfish or ulterior considerations, and that their condemnation is that of a principle underlying the business in so far as it is based upon the flat rate method.

The men who composed the committee are men who have either at no time regarded flat rate in any line of business as sound, or have long since discarded it in their own line of business, and therefore, it is safe to accept their report as logical and fair, regardless of whom it affects, or what business it is applied to.

In any business of great magnitude, the use of outside money

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is essential, money belonging to people who know nothing about the details of the business. This means that there must be something upon which to base confidence, some guarantee.

The bulk of the money so invested is given only after a careful study of the particular business by men whose judgment is known to be sound and whose conclusions are based not only upon past performances in the particular line but upon the principles involved, and who know why this or that investment is good and why it will continue to be good. These men have their rules or guides to follow in most cases, so that there are only the general conditions to study.

In the realty business they know that a certain investment is good or bad, because there is a fixed or tangible basis. The particular piece of ground cannot move, therefore the value of that piece must be based upon its present or probable future relations to its surroundings.

In the railway financial world they have their rules to follow, based upon the present and future population, and resources of its territory, together with the cost of constructing, equipping and operating a line.

Of recent years, much attention has been given to interurban electric lines and the men who have handled the money for their construction have formulated rules to guide them in determining the safety of such investments. Their basis is the present travel between the objective points by the existing methods of physical communication, together with the possible future increase, due to increased population, and the cost of constructing, equipping, maintaining and operating a line.

For instance, there is a town at one end of a line, of 10,000 people (adult population) and at the other end one of 5,000; they calculate that under similar conditions one-half of this combined population have travelled an average of one and one-half trips per week. Exact figures are unnecessary for the present purpose and the above is merely to show the method of determining whether or not the conditions are ripe for the investment necessary to build the line.

Now let us come to the telephone business from the investors' standpoint, referring to the point of view of those who are entrusted with the large amounts of money for investment purposes. What guides have they to go by or what basis was used by them in determining the value of past telephone investments? None, except the success of other companies that may have succeeded under conditions quite different from the ones under consideration.

This is not wholly true of all telephone investments, because in the long distance field there are accepted rules, based upon the use of the service of other telephone and telegraph companies, but it is true, in the development of local service telephone companies, that they have gone by guess work, which does not go with men whose judgment is at stake on investments.

That they have succeeded on this basis is not so much to their credit as to the credit of the business. Any other business would have fallen in ill repute with investors under the conditions, because, it could not have paid.

In New York, Chicago, Cleveland, St. Louis or in almost any of the large cities, railway, gas, electric light or water bonds are a staple form of investment and one need not peddle the proposition to reach at least a good listener. But the men who are ready to consider a local service telephone proposition are few and far between until you can show them a parallel between the telephone and the gas or railway proposition, and this can only be done when your earnings are based upon similar principles. In railways, a certain amount of travel brings a certain amount of money; in gas, a certain amount of cubic feet of output brings a certain profit; in electric lights a certain number of watt hours on the "gross output" meter, forms the basis of the financial possi-

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Form G-78
(Re-order by this Number)

SHEET NO. _____
AUDITED _____
ENTERED BY _____
DATE _____

REPORT OF NEW LEASES

AT _____ EXCHANGE, FOR _____

ITEM NO.	TELEPHONE NUMBER	TELEPHONE RINGS	NAME OF SUBSCRIBER	RESIDENCE OR BUSINESS	ANNUAL RATE	DATE OF CONNECTION	ADDED EQUIPPED FOR FRACTION OF GRANTED	REMARKS IF SCHEDULED RATE IS NOT CHARGED, PLEASE EXPLAIN WHY.
1								
2								
3								
4								
5								
10								
11								
12								

REPORT OF DISCONTINUED LEASES

	TELEPHONE NUMBER	TELEPHONE RINGS	NAME OF SUBSCRIBER	RESIDENCE OR BUSINESS	ANNUAL RATE	DATE OF CONNECTION	ADDED EQUIPPED FOR FRACTION OF GRANTED	REMARKS GIVE REASONS FOR REMOVAL OF TELEPHONE
13								
14								
23								
24								
25								

N. B.—If schedule rate is not charged, please explain why.
N. B.—If change of number, report as new and discontinued leases

_____ Local Manager

Approved _____ Gen'l Manager

Fig. 6. Form No. G-78, size, 10¾ x 11¼ inches. Used for reporting new leases from branch exchange to headquarters.

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bilities of the business, but in the telephone business. a certain number of telephones is no safe guide to the earnings of the company on its investment, because the telephone company that sells its service by the telephone never knows what its service or operating costs are going to be in advance. This is because it cannot control the amount of calls it must make, though it has fixed charges to meet in giving the service, and these charges are in proportion to the amount of service it must render.

The proper basis, therefore, is to make the call the unit of charge instead of the telephone, and if necessary, make a low fixed charge per month to guarantee a sufficient return aside from the traffic earnings to cover the interest and the investment of bonds. When this is done, the telephone bonds will find favor among the investors, and the wider development brought about in the industry will give employment to millions of money now seeking investment in other channels.

Economical Telephone Accounting and Filing Systems

ARTICLE III.—BRANCH EXCHANGE REPORTS, CONTINUED.

*By Charles C. Wilmot, Telephone Accountant.

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IN the "Report of new and discontinued leases, form No. 78," shown in Fig. 6, printed headings and instructions explain the purpose of the sheet so completely that it is only necessary to call attention to the great importance of giving definite information in the "Remarks" column, especially on new leases, where for any reason the schedule rate of the branch exchange is not followed; as in the case of concession made public offices, on account of franchise requirements, railroads or hotels for pay station booth privileges, etc., special rates to telephone employees, etc.

necessary explanations, so that the general manager can pass upon them intelligently without unnecessary correspondence. Authority is designed to be returned upon a printed slip, which will refer to the rebates which are approved by the item number shown at the left hand side of the sheet. This "Approval slip" should be pasted at the bottom of the duplicate sheet of form No. 79. This will be the authority for the branch exchange manager to allow rebates as per instructions printed thereon. Approved rebates are to be posted directly to the ledger accounts from the original entry on this form. A monthly recapitulation of

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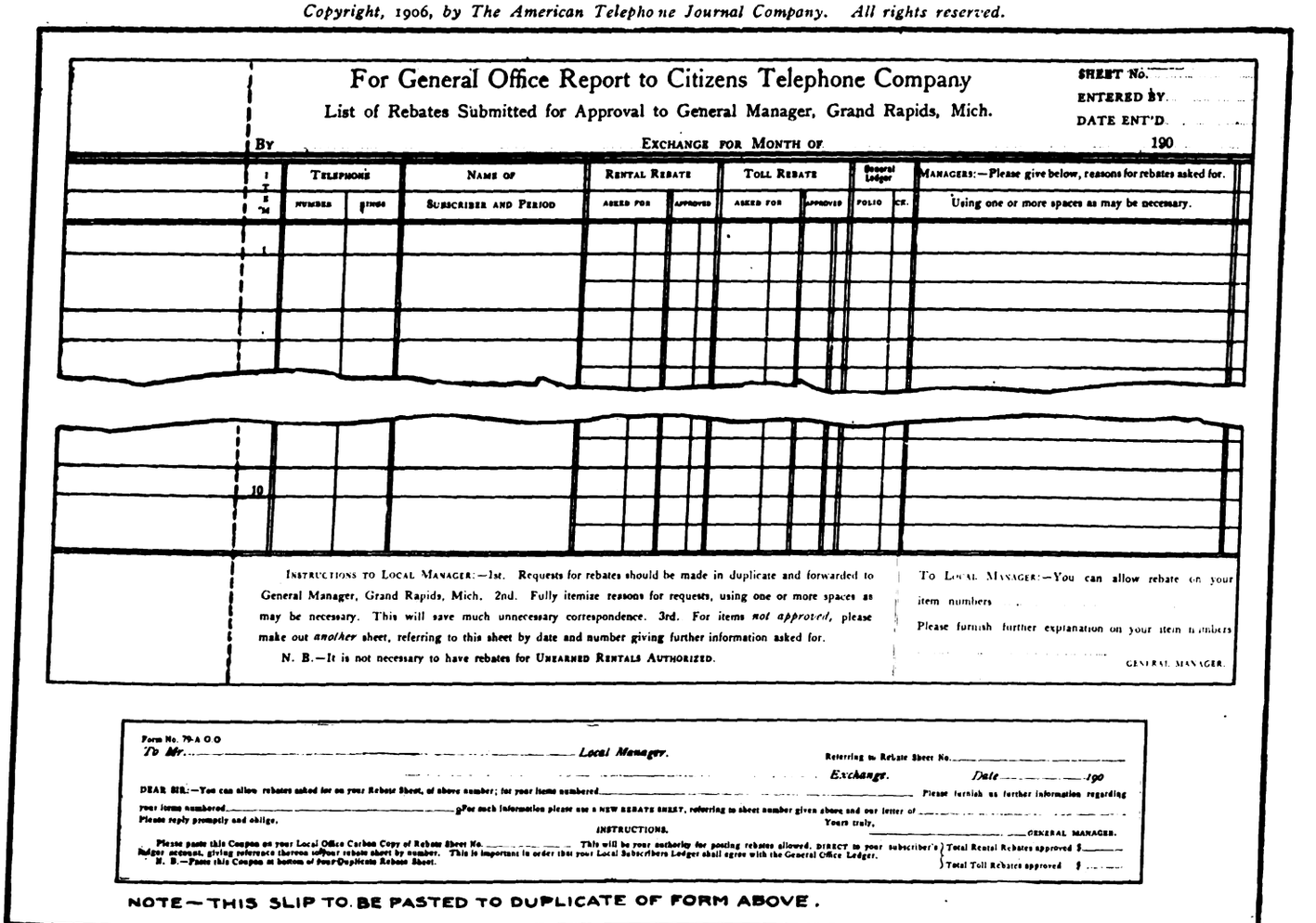

For General Office Report to Citizens Telephone Company

List of Rebates Submitted for Approval to General Manager, Grand Rapids, Mich.

SHEET No. ENTERED BY DATE ENT'D

BY EXCHANGE FOR MONTH OF 190

ITEM	TELEPHONE NUMBER	TELEPHONE KIND	NAME OF SUBSCRIBER AND PERIOD	RENTAL REBATE ASKED FOR	RENTAL REBATE APPROVED	TOLL REBATE ASKED FOR	TOLL REBATE APPROVED	General Ledger FOLIO	General Ledger CR.	MANAGERS:—Please give below, reasons for rebates asked for. Using one or more spaces as may be necessary.
1										
10										

INSTRUCTIONS TO LOCAL MANAGER:—1st. Requests for rebates should be made in duplicate and forwarded to General Manager, Grand Rapids, Mich. 2nd. Fully itemize reasons for requests, using one or more spaces as may be necessary. This will save much unnecessary correspondence. 3rd. For items *not approved*, please make out *another* sheet, referring to this sheet by date and number giving further information asked for.

N. B.—It is not necessary to have rebates for UNEARNED RENTALS AUTHORIZED.

TO LOCAL MANAGER:—You can allow rebate on your item numbers

Please furnish further explanation on your item numbers

GENERAL MANAGER.

Form No. 79-A O O

To Mr. ——— Local Manager.

Referring to Rebate Sheet No. ———

——— Exchange. Date ——— 190

DEAR SIR:—You can allow rebates asked for on your Rebate Sheet, of above number; for your items numbered ——— Please furnish us further information regarding your items numbered ——— For such information please use a NEW REBATE SHEET, referring to sheet number given above and our letter of ———

Please reply promptly and oblige,

Yours truly,

——— GENERAL MANAGER.

INSTRUCTIONS.

Please paste this Coupon on your Local Office Carbon Copy of Rebate Sheet No. ——— This will be your authority for posting rebates allowed, DIRECT to your subscriber's Ledger account, giving reference thereon to your rebate sheet by number. This is important in order that your Local Subscribers Ledger shall agree with the General Office Ledger.

N. B.—Paste this Coupon at bottom of your Duplicate Rebate Sheet.

Total Rental Rebates approved $———

Total Toll Rebates approved $———

NOTE—THIS SLIP TO BE PASTED TO DUPLICATE OF FORM ABOVE.

Fig. 7. Rebate report, to be furnished from branch exchange to main office. Duplicate is kept for branch exchange record, with slip reproduced at lower part of illustration pasted to duplicate. Size of sheet, 10¾ x 11¼.

The next illustration, Fig. 7, will give an idea of the ruling of a "Rebate sheet," form No. 79. All requests for rebates for either rental or toll charges should be made on a form giving all rebates given can be taken off, using form No. G-77 for the purpose. The heading of the sheet should be "Rebates for month of ———, 190—."

(To be continued.)

*Editor's Note: Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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The Nebraska Independent Telephone Association Holds Its Annual Convention

AT the annual convention of the Nebraska Independent Telephone Association held in Lincoln the delegates transacted business which included the following:

Passing of resolutions favoring united action to support wholesale interests in only those cities favorable to Independent telephone interests; provision for arbitration board and traveling secretary; provision for dividing state into five districts to handle local matters; raising of funds for association expenses for 1906; provision for early issue of a state directory of 35,000 Independent telephones; endorsement of work of former legislative committee, which was reappointed; affiliation with the National-Interstate Telephone Association representing fourteen states and two million telephones.

Representatives from a number of adjoining states were present, and a hundred and fifty Nebraska companies sent delegates, while a number of manufacturers were represented by salesmen and by exhibits.

The association is making most satisfactory progress, the secretary's report showing a growth during the year that is remarkable. Steps were taken to carry on the good work of the former legislative committee, consisting of Frank H. Woods, Judge Allen W. Field and Col. C. J. Bills, which only failed of securing an Independent telephone measure in the last legislature by one vote. The convention was attended by Theodore Gary, of Macon, Mo., vice-president of the National-Interstate Telephone Association.

The executive committee was authorized to divide the state into five or more districts, such districts to handle in their local meetings all matters of purely local interest, including arrangement of toll service, division of territory, etc. The executive committee was constituted an arbitration board to settle disputes where necessary. The appointment of a traveling secretary will insure a more rapid extension of membership. The assessment levied for supplying funds to meet the aggressive campaign during the coming year was passed unanimously, and indicates the good financial condition of the members as well as their appreciation of the importance of the association's growth to them.

Provisions were made for making a state directory containing the names of 35,000 people now accessible by toll-lines.

The following officers were elected for the coming year:

Frank H. Woods, Lincoln, president; W. Clapp, Kearney, vice-president; R. E. Mattison, Lincoln, secretary and treasurer. In addition to the above, W. E. Bell, of York; Thomas Parmalee, of Plattsmouth, and G. J. Garlow, of Columbus, constitute the board of directors. Delegates to the National Association: F. H. Woods, Lincoln; W. E. Bell, York; T. H. Pollock, Plattsmouth; alternates, R. E. Mattison, Lincoln; W. J. Stadelman, Kearney; I. D. Clark, Papilion.

At the annual meeting of the Telephone Traffic Association, which handles the clearings for toll business, the following officers were elected: T. H. Pollock, Plattsmouth, president; W. E. Bell, York, vice-president; R. E. Mattison, Lincoln, secretary; F. H. Woods, Lincoln, treasurer.

The secretary in his report stated that during the past year a great deal of progress had been made, both in the building of exchanges and new toll lines. Several hundred miles of new copper line have notably extended and improved the toll service. Although practically every company in the state has been approached, the secretary reported that with three exceptions no company of importance had entered into any agreement for connection with the lines of the Bell company.

R. E. Mattison, who has been acting secretary since November, furnished in his report statistics compiled from reports received from individual companies. These figures are the first to furnish accurate information of this nature. They show the following figures:

Independent telephones operated	36,028
Switchboards operated	138
Toll stations operated	166
Miles of toll line	3,148
Money invested	$3,118,400
Number of stockholders	3,640
Number of Bell telephones operated in same territory	11,902

These numbers do not represent all the telephones operated throughout the state, these being practically the number of telephones that are completely connected with one another by good toll lines. One year ago there were no Independent subscribers in Nebraska who could talk with more than 5,000 other Independent telephone users. To-day any one of the 35,000 telephones can be connected with any of the others of the group.

Sixty-two new companies have been incorporated in the state during the past year, which, together with extensive improvements to other plants, represent an expenditure of at least $1,000,000. The territory is being developed faster and is being equipped with better apparatus than has been used heretofore. The territory already developed by toll lines shows three Independent telephones to one of the opposition, and as additional territory develops the ratio will not decrease.

PRESIDENT GODDARD WARNS KANSAS OPERATORS AGAINST SUB-LICENSE CONTRACTS—CONCLUSION OF ADDRESS BEFORE THE ANNUAL CONVENTION.

"Many companies are handicapped seriously by being in debt. It places them in the power of manufacturing concerns, and in many ways interferes with the proper conduct of their business. But you say, 'How can we avoid this indebtedness? If we go to the bank to borrow money the rates of interest are high and the loans will be for a short time only. When they may have to be paid we have no more stock for sale or we cannot or do not care to sell any more stock, and I apprehend there are many instances when the growth of the business and the growth of the indebtedness become almost appalling. The legitimate and proper form of carrying such indebtedness by a telephone company is in the shape of bonds. But you say, 'Where can we find a market for the bonds?' and you write some Eastern bond broker, and he tells you that he cannot handle them. Your market for the bonds is at home. If the bonds are issued and are not sold they draw no interest. When they have been issued they can be used as collateral upon which to borrow money. You can probably induce some of your friends and acquaintances to take a few of them. After six months roll around and the interest is paid promptly on the bonds that have been sold the holder gets to feeling good, and the first thing you know people begin to inquire about the bonds. You will be surprised at the source from which these inquiries will come, and at the readiness with which the bonds will sell, but they probably will not go off at once. Frequently supply houses will take a few of the bonds if the trust deeds securing them have been properly drawn and executed and everything has been done in a legal manner.

"In conclusion you have got a good business proposition or you can make it such. Be alive to all your interests; take some of the telephone journals and read them; be exceedingly careful in the purchase of your instruments and apparatus, and see that you get

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only the best; belong to the State association and keep in touch with its officers, and whatever you do, don't monkey with the Bell company. If you sell them a majority of your stock you might as well give them the rest, for in all probability you will never get any more out of it. If you make sub-license contracts with them you will live to regret it. Don't believe what some irresponsible agent tells you about some other company, and whatever you do, don't give them an option on your own property or plant. They don't get your option for the sake of taking the property under it. They want to use it as a club to beat out your brains, and to bring somebody else in line with them."

A LONG DISTANCE CONCERT.

By Robert J. Jessup.

SOME time ago the author participated in a musical performance given by two players separated by many miles, with the audience located at yet a third distant point. The author, provided with a head receiver connected to the telephone circuit and standing before a large horn attached to the transmitter, played on a French horn for the benefit of listeners in the office of the Spokesman-Review, at Spokane, Wash., 726 miles from Salt Lake City, in which place he was located.

The remarkable feature of the performance was that the piano accompaniment was played by a music dealer named Reeves at his store in Helena, Mont., 525 miles away. A transmitter, equipped with a megaphone, was mounted on top of the piano and this player also wore a head receiver.

In playing the Miserere, from Il Trovatore, for instance, your correspondent waiting in Salt Lake, could hear Mr. Reeves play the introduction, and then being well acquainted with the score, knew just when to begin with the melody. Then at the close of the strain, he would listen until the intermezzo had been played on the piano up at Helena, and then begin again. There was not the slightest jar between horn and piano during the entire program, and people listening along the line thought both instruments were being played in the same room. Your correspondent serenaded the adjutant's office at Fort D. A. Russell and the offices of the Cheyenne newspapers 500 miles distant, and one night was got up out of bed at 11 o'clock to serenade numerous central offices of the company scattered through the southern part of Utah. General Manager Murray was much interested in these experiments, and afforded every facility for their conduct. When satisfactory connections are made with the Pacific coast, an effort will be made to serenade the newspaper offices of several coast cities from Salt Lake. It is believed that the experiment could be carried on with success with Omaha, and even points east of that city.

An attempt was made by the telephone engineers to locate transmitters in front of the great organ in the Salt Lake Tabernacle, and reproduce organ recitals at points along the system, but the Mormon Church authorities were not favorable to this, and the experiments were cut short before they had been perfected.

CUYAHOGA COMPANY OF CLEVELAND SHOWN TO BE RAPIDLY INCREASING IN STRENGTH.

THE financial statement submitted to the stockholders of the Cuyahoga Telephone Company of Cleveland, O., shows a remarkable improvement. Less than four years ago when President F. S. Dickson was placed at the head of the company the earnings showed a net surplus for the year of $21. The company was not paying its bond interest until several months after it was due and was barely holding its own. It was sadly involved as a result of the Everett-Moore financial troubles and was in need of a large amount of new equipment. It was the mission of Mr. Dickson to straighten things out and put the company on a paying basis. It was a tough proposition but he has done more than any of his supporters at that time hoped for. He has not only equipped the company with a complete new central switchboard, but he has developed the business until it is nearly three times larger than when he found it and has made new business pay. The result is the company for 1905 has a net surplus, after everything has been paid, of $31,014.25. One feature of special interest in the statement is the fact that the profit sharing plan, introduced by Mr. Dickson, cost the company during the past year $13,481.87.

One year ago the statement showed a yearly surplus of $11,155.71, the growth for the year amounting to $19,858.54. This showing was one that caused a great deal of favorable comment among the stockholders and business men of the city. The company started the new year with a surplus fund of $58,324.06.

The statement showed the rental income from the telephones had amounted to $488,451.28 for the past year, while for the previous year it amounted to $350,422.96, the gain being $138,028.32. The gross earnings for the year grew from $435,274.02 to $587,487.01 for the past year.

The gross income of the company for the past year grew from $653,690.25 one year ago to $1,200,280.64 for the past year. A part of this is explained by the sale of $385,387.20 of securities.

During the years Mr. Dickson has been directing the affairs of the Cuyahoga he has had the strongest sort of organized opposition from the Bell interests, that company exerting itself to hold the lead it had on the Cuyahoga. During the past twenty-two months the list of subscribers of the Cuyahoga has doubled and the company on the first day of February placed in commission its 21,000th telephone. In the management of the company Mr. Dickson has drawn about him a working organization of young men who have been developed in the companies under his control and advanced as rapidly as they showed ability to manage larger affairs. He has trimmed expenses and brought the working efficiency of the organization throughout to a new high level, the result being the rapid growth of business and the very high rate of prompt collections. He took the position that service must be good and also must be paid for and he has not departed from either proposition.

AGREEMENT FOR CONNECTIONS ENFORCED BY COURT.

A HEARING has been had at Washington, Pa., in a proceeding by J. T. Bebout and the Claysville Telephone Company against the Federal Telephone Company, seeking to restrain the latter from refusing service and connections to the plaintiff company over the defendant company's lines, as agreed to in a certain paper drawn up by the two companies. By the agreement with the Federal company no connections were to be made with the State Mutual Company. Connections were made with this company, the Federal people alleged, and they proceeded to cut the wires and since have refused connections over their lines by the Claysville company. The plaintiff company alleged in its statement, that the only message ever received over the State Mutual lines was a trick message and received by the operator as coming over the P. & M. lines. The court after hearing the testimony, handed down an opinion refusing the preliminary injunction prayed for. The plaintiffs can now send their customers' messages at Washington and Canonsburg over the Federal lines, and the defendant company cannot refuse them if the tolls that are charged others for like services are tendered. The result is subject to reversal on appeal.

MARIETTA, OHIO, TO HAVE NEW PLANT.

EXTRAORDINARY growth of the business of the Marietta, Ohio, Telephone Company has necessitated the reconstruction of the entire plant. This will involve an expenditure of $50,000 and will provide equipment for more than double the present number of subscribers. A 1200-line common battery switchboard will be installed, together with several miles of aerial and underground cable. If a suitable site can be secured the company will erect its own building and thus be able to secure the right quarters necessary for its business.

The decision to undertake this work was made at a recent meeting of the board of directors held at Parkersburg. The work will be started about the first of April and the company expects to employ sixty additional men so that the changes can be made as soon as possible and with the least amount of interference to the service.

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THE EDITOR'S PAGE

VALUABLE REPORTS FROM NEBRASKA.

THE report of the acting secretary at the annual meeting of the Nebraska Independent Telephone Association is made especially interesting by the fact that it contains figures which furnish accurate information in regard to the progress made during the past year. In order to successfully oppose the efforts of the Bell companies to tie up small Independent plants by sub-license contracts it is necessary to show the managers of such systems, as well as the public, that the Independent toll service is being rapidly developed. The Nebraska association seems to have made a most admirable start in this work.

INSTRUCTIVE ADVERTISING.

TELEPHONE companies may profitably use newspaper publicity for other purposes than increasing the number of their subscribers and paid connections. It may be the means of educating the public in the methods of carrying on the telephone business in such a manner that the number of illogical complaints against the service, and the strength of objections to the charging of reasonable rates will be materially reduced. It is a well known fact that the average telephone subscriber has an entirely inadequate conception of the details of procedure of a telephone company in its various departments. This ignorance is so extensive that not only is there no general knowledge of the manner of handling connections, but there is an almost total lack of information as to the extent of the wire plant, switchboard mechanism and the personal service which is at the disposal of any individual whenever he chooses to lift his receiver from the hook.

The reason for this ignorance has been pointed out in an admirable manner by President Dickson in his recently published book on "Telephone Investments." He calls attention to the fact that a telephone company which aims for good construction incidentally accomplishes the concealment of the means by which it secures results. The subscriber sees only his instrument upon the desk or wall, and is content to allow his knowledge of the equipment to go no farther than the piece of apparatus which makes the most obvious appeal for notice. He is, no doubt, aware that wires are run to the exchange; but, in places where these are exposed, the number in evidence in a single location is usually insignificant, and neither conveys an idea of complexity nor of costliness. Where aerial cable is used it is still less obtrusive than are open wires. Underground cable is completely out of sight, and receives practically no consideration. From an operating standpoint, the subscriber is accustomed to hearing the standard responses and challenges upon his line, and is rarely able to tell whether the exchange is in the hands of two operators or twenty. Only the obvious and prominent features of daily life strike attention and demand consideration, and the intricacy of a telephone system is far from being evident to an outsider.

A telephone company experiences much inconvenience from time to time arising from this state of insufficient knowledge. A number of these annoyances are due to complaints concerning service. A subscriber remembers every detail of incorrect connections and delays, and adds his grievances one to another until the sum seems to him unreasonable. Then a complaint is filed and the telephone company has to enter into a detailed explanation, and quite often undertake special investigations of the service. Busy reports on party lines in many cases are considered to be due to some neglect on the part of the company and the occurrences of unjust complaints that a line is falsely reported busy are by no means infrequent. Yet, in spite of his readiness to condemn the service, as the result of an occasional delay or inaccuracy, the subscriber seems to be extremely unwilling to cooperate with the company for the improvement of the advantages which it is able to offer. In many sections of the country the impatience of the subscribers, and their failure to comprehend the object of the work which is being carried on, has practically forced the abandonment of the method of taking service observations from subscribers' stations. The same lack of tolerance that makes itself so strongly felt in the operating department is observed in maintenance work.

While subscribers' complaints afford a check which assists a company to obtain the highest degree of perfection in its service, there are few officials who do not feel that it is impossible to avoid occasional errors, and that the dissatisfaction arising from these errors is altogether in unjust proportion to their frequency and the inconvenience which they cause. In many instances the remedy for this unusual readiness to criticize lies in the education of the subscribers. They should be taught that the company employs the services of numerous employees, every one of whom, although well trained, is liable to make an occasional mistake. It is an easy matter to convince the average person, by a proper presentation of the facts, that the number of such errors which affect each individual is surprisingly small, as compared to the immense amount of business handled in every well conducted exchange. A man who is familiar with the general lay-out of a wire plant realizes the complexity of the connections involved in putting through a call, and is likely to be much more tolerant of an occasional interruption. His sense of fair play will cause him to realize that a telephone company, which must experience many difficulties, is conducting its business with an efficiency which, as compared to other lines of work, is extremely high.

Although the simplest and most direct manner of conveying this information to a subscriber is by an exhibition of the property, and explanation of the method of doing work, it has been found that few people can be induced to leave their ordinary affairs for sufficient time to examine a telephone company's plant. The method which suggests itself after this as being the most satisfactory is the use of newspaper aricles. The publication in local journals of descriptions of a plant, with photographs showing its size and general features, should convey to the public the ideas which managers find it desirable to impress. This is interesting news, and at the time of a cut-over, or extensive improvements in construction, would undoubtedly be given a prominent place by almost any paper. The general condition of the service and the object of tests furnish the basis for instruction in another line. The public might well be educated in figures to such an extent that it would have a fair-minded appreciation of what is really good service from a general standpoint, and the publication of service records will be a means of promoting confidence.

This plan is being worked out to a certain extent in many places and the results obtained show that it produces a most agreeable effect. It is a form of advertising which is comparatively inexpensive. It goes far toward producing a feeling of personal association which is so substantial an assistance to the production of that most valuable asset—a satisfied subscriber.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

NUMBERING AND LETTERING TELEPHONE POLES.

Do you know of any cases bearing on the right of a common council to require telephone companies to number their telephone poles and designate them with initial letters so as to tell what companies the poles belong to? L. B.

IT has been held that the common council or other proper authorities under the municipality's police powers, have authority to require the numbering and lettering of poles belonging to telephone and electric light companies. Such a regulation is held to be a reasonable one because it assists the police authorities to properly regulate the use of the streets. Monongahela v. Monongahela Electric Light Co., 12 Pa., Co. Ct. 529.

DUTY TO PATRONS' CUSTOMERS.

Our company had some telephone apparatus installed in a grocery store and during an electrical storm a customer of the grocery man was injured by what he claims was the negligent escape of electricity due to our fault. Will you tell me whether we are bound to protect the customers of a patron of ours when we have a contract with the customer, and do not agree with the patron that we will protect his customers against accident? R. M.

THE courts hold that a duty is owed to the customers of a merchant in whose store a telephone is installed as well as to the store keeper himself, and that where a customer is injured by the negligent escape of electricity he can recover from the company. The editor therefore thinks that your defense does not lie along the line suggested, but that it would be better to rest your case upon the contention that you had taken all reasonable precautions to prevent accident.

INJUNCTIONS ISSUED IN FAVOR OF PEOPLE'S TELEPHONE CO.

THE Consolidated Telephone Company, of Clarksburg, W. Va., has petitioned Judge Mason for an injunction restraining the contractors at work on the extension of the Fairmont and Clarksburg Street Railway lines from further alleged destruction of the telephone company's property. The petition sets forth, that on June 6 a large tree was felled across the company's wires and that on July 21 the offense was repeated, and then a notice was sent to the contracting parties over the signature of Manager Barnes. It is reported that no attention was paid to the notice and after that date the offense was repeated at different times and has greatly damaged the business of the company.

The telephone company avers that the business of the Fairmont Coal Company has been threatened with a loss from one source amounting to $5,000 a year, besides a large amount of other business between Clarksburg and Fairmont and that the company has expended as much as $100 already for repairs of lines damaged by the railway company and that other losses will amount to $1,000 or $2,000. The petition also prays that a commission be appointed to ascertain the amount of damage and cause to be entered a decree in favor of the petitioner for that amount.

CONTROL OVER ELECTRIC SUBWAYS IN NEW YORK.

THE decision that has been handed down by the Appellate Division of the First Department of the State of New York, in the case of the West Side Electrical Company against the Consolidated Telegraph & Electrical Company, is gratifying to Independent telephone men throughout the United States. The contention of the defendant corporation, that authority to use electric conduits in the streets of New York City has been vested since 1887 in the Board of Aldermen, and not in the Board of Electrical Control, was sustained in the decision.

The action grew out of an effort on the part of the West Side company to restrain the Consolidated company, by injunction, from interfering with it in the laying of its cables in the conduits.

The opinion, written by Justice Patterson, with Justices O'Brien and Laughlin concurring, quotes the transportation corporation act of 1890, to the effect that a company, incorporated for the purpose of using electricity for light, heat or power, may provide and distribute electricity "with the consent of the municipal authorities." Justice Patterson added that the law of 1887, creating the Board of Electrical Control, vested in the latter merely powers of regulation as to the methods of using the subways, but did not give the board power to grant franchises. That power, he said, is still vested in the Board of Aldermen.

Justice Ingraham wrote a dissenting opinion, in which he held that the law of 1887 conferred much broader powers upon the Board of Electrical Control, and that within the powers to be exclusively exercised by the board is that of granting consent to the use of the streets of New York by a corporation to furnish electricity for lighting purposes.

Interest in this matter is now rather reminiscent, as there is no longer a Board of Electrical Control. Their powers have been vested by the Legislature in the Board of Aldermen.

BREAKING AND CONTACT OF WIRES.

AFTER a severe sleet storm that prevailed the greater part of the day a wire of the Pennsylvania Telephone Company in the city of Lancaster, Pa., broke and fell across the wire of an electric light company, the end lodging in a pool of water in the gutter. The pool of water became heavily charged with electricity and a horse led by its owner through the water received a shock, fell to the ground, where he came in contact with the "live" telephone wire and was killed. The man did not receive a shock because he wore rubber boots. He testified that he did not know the wire was in the water. The owner of the horse sued the company, but the court directed a verdict for the defendant. The case being appealed to the Superior Court, the plaintiff contended that no other evidence was necessary to make it a prima-facie case of negligence than that the wire broke and fell to the ground. The court in deciding against the plaintiff said that to hold as between a telephone company and one with whom it had no contract relation that a prime-facie presumption of the company's negligence is raised by proof that its wire broke under the strain of a sleet storm would require the court to go far beyond any previous Pennsylvania decision. The plaintiff further contended that the defendant was negligent in not maintaining guard wires to prevent the telephone wires, in case of their falling, from coming in contact with the electric light wires. On this point the court held that the answer of the company to the effect that plaintiff's statement contained no allegation on which to base it was well founded. The doctrine of *res ipsa loquitur* was also discussed.

The decision also held that a finding that the company was negligent because it did not learn of and repair this particular break of its wires within an hour and a half would be unreasonable. Aument vs. Pennsylvania Telephone Co., 21 Law Rev. 361.

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IN THE OPERATING FIELD

WEST VIRGINIA WESTERN COMPANY HAS LARGELY INCREASED ITS EARNINGS.

PRESIDENT J. H. LININGER, of the West Virginia Western Telephone Company, in his annual report stated that the earnings of the company for the year just passed were $45,988.77, against $38,538.90 in the year 1904. The expenses were $31,382.57, against $26,944.16 the preceding year, and the profits were $14,606, against $11,594.74 the previous year. During the last quarter of the year 1905 the receipts of the company amounted to $12,498.08, which was nearly $800 more than for the preceding quarter and nearly $2,000 more than for any previous quarter. The president predicts that the receipts of the company this year will amount to $50,000.

Numerous extensions have been made during the past year. Switchboards for the exchanges at Newport, Matamoras and Friendly have been purchased and delivered. The line up the Ohio River, from Marietta to Sistersville, is well along and an order has been placed for the Sistersville switchboard. During the year the company put into operation a metallic copper line from Salem to West Union and hopes by spring to have it extended from the latter point into Parkersburg. It has also rebuilt the lines from West Union to Shirley and from West Union to Eagle Mills. A new line from Auburn to Cox's Mills, enabling connections to be made with Weston and other interior points by a more direct route than via Clarksburg, greatly improves the service to that section.

The total expenditure for extensions and new work during the year was $22,297.69, of which sum $18,140.06 was expended in the Parkersburg exchange, $868.06 in the various country exchanges and $3,289.57 on toll lines. Of the $18,140.06 expended in Parkersburg $5,725 was for a 760-line addition to the switchboard.

The most important toll connection arranged for during the year was with the U. S. Telephone Company, a contract having been made to connect with its lines at Parkersburg some time in this year. This connection will give unsurpassed service to all principal points in Ohio except Cincinnati, which at present has no Independent telephone system, Indiana and Michigan; also to Louisville, St. Louis and other Western points.

The board of directors of the company re-elected the old officers as follows: President, J. H. Lininger, of Harrisville; vice-president, J. E. Carle, Eatons; secretary, R. H. Rutherford, Zanesville, Ohio; treasurer, C. T. Hitshew, Parkersburg; general superintendent and office manager, A. C. Davis, Parkersburg.

SOUTH DAKOTA ASSOCIATION HOLDS MEETING AT SIOUX FALLS.

MEMBERS of the South Dakota Independent Telephone Association held their sixth annual convention at Sioux Falls on Jan. 10, 11, 12. This association has done some excellent work in aiding and developing the Independent movement. The systems represented cover nearly all of the State, and their management is in the hands of progressive men who are working for the best interests of the community at large.

The convention was called to order by the secretary, and an address of welcome was read by W. T. Doolittle. This was followed by the speech of the president, Hon. C. B. Kennedy, of Canton. Other addresses were made as follows: "The Independent telephone company," George W. Burnside; "Our duty to the public," J. L. W. Zietlow, of Aberdeen; "What constitutes deterioration," R. P. Crothers, of Hetland, S. D.; "The farmers' telephone company," M. B. Ryan, Beresford.

The evening session was held in the council chambers at the city auditorium, and the following subjects were discussed: "Would it be to the best interests of the public to compel telephone companies by law to connect with one another?" E. R. Buck, Hudson; "Telephone securities," C. C. King, Scotland; "How to handle three companies' business," T. F. Robinson; "Is it a benefit or detriment to have two exchanges in same town?" W. G. Porter, Sioux Falls; "Who is responsible for the adverse sentiment against existing exchanges?" J. A. Steninger, of Parker; "The relation of the supply houses to the telephone companies," W. G. Beiclehaupt, Aberdeen.

Every paper read brought forth a lively discussion, which had very beneficial effects. A banquet was held during the evening. On Thursday the general business session was held, and Friday was given up to an examination of the exhibits of several of the manufacturing companies.

The following are the officers of the association: President, Hon. C. B. Kennedy, of Canton; vice-president, J. A. Steninger, of Parker; secretary, H. P. Hartwell. Mayor Burnside, of Sioux Falls, is a member of the executive committee.

Amongst the delegates present were the following: P. C. Cockrill and C. H. Smith, Sioux City; W. G. Beiclehaupt and P. F. Zietlow, Aberdeen; J. O. Johnson, Lake Preston; E. L. Ketchum, Montrose; E. D. Julius, Davis; N. E. Gibbons, Yankton; A. P. Hoard, Alvester; T. J. Robinson, Pipestone, Minn.; H. T. Marris, Elk Point; Dr. E. R. Buck, Hudson; M. J. Burnette, Tyndall; C. C. King, Scotland.

PLANT AT OTTAWA, KANSAS, TO BE IMPROVED.

IMPROVEMENTS are to be made by the Home Telephone Company of Kansas City upon the plant at Ottawa, secured through the recently acquired control of the Ottawa Telephone Company. The plans include an addition to the present exchange building and the installation of a new switchboard, as well as a thorough reconstruction of the outside plant and new telephones for the subscribers. The estimates which have been prepared indicate that the cost of making preparations for the high class of service which is to be given by the Home company, will be in the neighborhood of $30,000.

NEW SYSTEM IN OPERATION IN BUCKS COUNTY, PENNSYLVANIA.

INDEPENDENT service in and around Bucks County, Pa., has been greatly extended by the opening of the new system of the Franklin Telephone and Telegraph Company at Springtown, Pa.

The territory covered by the company extends from Durham Furnace to Richlandtown with trunk lines running from Riegelsville to Quakertown, giving long distance connections at each of these places, as well as a trunk line to Bethlehem by way of Hellertown. By arrangement subscribers are given unlimited service with all telephones at Quakertown, Richlandtown, Applebachsville, Thatcher, Trumbauersville, Cressman, Milford Square, Shelly, Rosedale, Brick Tavern, Steinsburg, Zion's Hill, Rock Hill, Riegelsville, Kintnersville, Ferndale, Revere, Holland, Riegelsville, N. J., Milford, Finesville and Bloomsburg. The rates upon unlimited services in this territory are for residences $12 and business $15. The central office is situated at Springtown.

NEW KANSAS INDEPENDENT COMPANY REPORTS RAPID PROGRESS.

REPORTS to the stockholders by the officers of the Farmers' Telephone Company of Salemsburg, Kan., show that from the forty telephones connected at the time of its organization, nine months ago, it has grown to 182, with free communi-

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cation with nearly 800. It now has 140 miles of wire and 1,874 poles.

The following board of directors for the coming year was elected: Gust Eckwall, Wm. Newick, C. O. Larson, Albert Anderson, Joe Bergquist, S. V. Pihl, Carl Magnuson, C. O. Kampe, A. Thelander and J. Anderson.

The officers elected are as follows: President, C. O. Kampe; secretary, A. Thelander; treasurer, A. W. Miller.

It was decided to erect a building large enough to make a comfortable home for the exchange force as well as to provide for the company's business.

REPORT OF DIVISION OF EXPENSES OF WISCONSIN INDEPENDENT COMPANY.

THE Monroe Telephone Company has recently voted to increase its capital stock from $25,000 to $36,000, to take care of the extensions made necessary by the natural growth of the company, and other expenses necessary for keeping up its standard of service. In the secretary's report were given the following figures, showing the division of expenses for the past year:

Construction	$1,086.18
Maintenance	1,936.68
Operation	3,178.57
	$6,201.43

The item of construction is divided as follows:

Labor	$403.69
Poles, arms and glass	42.68
Outside wire and materials	445.53
Freight and express	19.47
Drayage and livery	12.45
Switchboard and telephones	202.35
Inside materials	14.47
Sundries	34.02
	$1,174.66
Materials sold	88.48
	$1,086.18

The item of maintenance is divided as follows:

Labor	$2,223.89
Outside wire and materials	171.44
Inside materials and batteries	577.27
Poles, arms and glass	33.85
Drayage and livery	158.80
Freight and express	33.28
Sundries	20.20
	$3,218.73

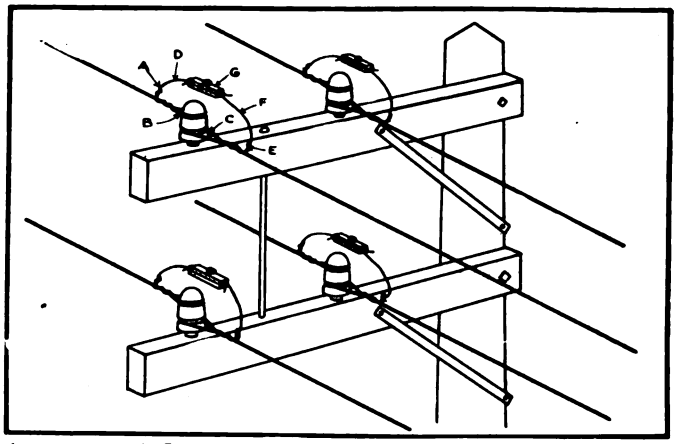
The report showed a net earning on the investment of over ten per cent., this percentage, however, including the amount set aside for reconstruction purposes. The previous board of officers were re-elected as follows: President, C. W. Twining; vice president, Dr. W. B. Monroe; treasurer, J. C. Penn; secretary, Frank A. Shriner; manager, P. J. Weirich.

A TEST POLE FOR RURAL LINES.

By G. W. Leyda.

FOR exchanges which have many farmers' lines connected, the use of a test pole at the city limits forms a very useful means of connecting the rural lines to the city wires. Where a heavy iron wire is used for farmers' lines the difficulty of making a test when the line has to be opened, and later a splice made for closing the connection, is evident to all managers who are familiar with these conditions. The method shown in the accompanying illustration has proved itself, after considerable experience, to be very satisfactory. It does not cause additional troubles and makes the opening and closing of the line for testing extremely easy.

As this plan is designed to be applied to a pole located at the city limits or thereabouts, in order that the farmers' lines may be definitely separated from the city leads, the wires should be dead-ended upon double grooved insulators. In making the dead end, the end of the wire should be left about one inch long projecting from the final turn of the spiral used for fastening. To this projecting end there should be soldered a soft copper



Arrangement of Connections on Test Pole. Line ties B, C, have long ends, A, E, to which are soldered copper extensions D, F. The line is carried through by connector G.

tie wire about fourteen inches long. Each of the four ends terminating upon the two insulators should be arranged in this manner. The copper wires for the city and country ends of the line may then be joined together by means of test connectors, allowing the line to be quickly opened and closed again after the test is finished. The use of the copper tie provides a flexible wire which can be bent into any desired form and very conveniently handled. If it is necessary, this form of construction makes it very easy to make a transposition at this pole. The use of this device is found to provide for as firm a connection as an ordinary joint, and effects a considerable saving in time.

HOME TELEPHONE COMPANY, OF HAMILTON, OHIO, REPORTS PROGRESS.

AT the annual meeting of the stockholders of the Hamilton Home Telephone Company the reports showed that during the last year the company has made many important extensions. It has put in 76 miles of poles in Butler County, has strung 20 miles of copper wire, laid 20,000 feet of cable and added 600 telephones. About 245 miles of iron wire have been put up. New exchanges have been built at Shandon and Trenton. With all these extensions and improvements the company earned about $50,000, and after paying all fixed charges, expenses and dividends, will still have a good surplus with which to enter upon the work of the new year.

There was no change in the board of directors and officers, which remain as follows: Frank Hughes, president; Charles E. Griesmer, vice-president; J. W. Sloneker, secretary; F. W. Whitaker, treasurer; W. Gilbert Thompson, manager; Sam D. Fitton, O. M. Bake, J. C. Slayback and F. M. Barden, directors.

ANOTHER BELL RUSE DEFEATED—CENTRAL UNION, LIKE CUMBERLAND, CONCEALS IDENTITY.

AT Spencer, Indiana, the New Long Distance Telephone Company (Independent) has been granted a franchise to establish both a local and toll line system. A local company has been organized and poles are being planted and wires strung for the new system.

The council granted this franchise to rebuke a deception practiced on the people by the Mugg Telephone Company and the Central Union Telephone Company. The business of the Mugg Telephone Company in Spencer has been taken over by the Central Union, but in order to appease the people they gave out the statement that the Mugg had taken over the business of the Central Union, and that the Central Union's office had been moved to that of the Mugg company. It is predicted that in a few months the New Long Distance company will have practically all the business in Spencer.

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QUERIES

POLE SUPPORT FOR SWAMPY GROUND.—(654.)

Will you kindly tell me what method of construction is desirable in swampy land where the mud is too soft and too deep to give a solid bottom and firm support for a pole? R. F.

It is considered good practice to support poles in such locations and hold them in line by simply bolting to the foot of the pole two pieces of creosoted pine planking, crossing at right angles. This forms a very cheap support and one which is easily applied. It is sometimes necessary to reinforce the pole by putting in a push and brace, the foot being of the same construction as that for the base of the pole. An additional precaution is sometimes taken with lines exposed to strong winds. In this case a hole about the base of the pole is filled with concrete, which acts as a counterweight to assist in holding it upright.

Where neither of these methods could be applied on account of the extreme softness of the ground, it is customary to plant the pole and to bolt to it just above the ground and at right angles to the line, two pieces of planking about ten feet long. To these two planks are nailed short pieces of plank about three feet long, these planks being nailed at right angles to the ten foot plank. Four pieces of planking are then fastened, two on each side of the pole, extending from a point on the pole about five feet above the ground to each end of the before-mentioned ten foot plank.

With this form of construction the weight of the poles and line is distributed over a large bearing surface in such a manner as to not only prevent the line from sinking, but to brace it against a tension tending to tip the pole to one side.

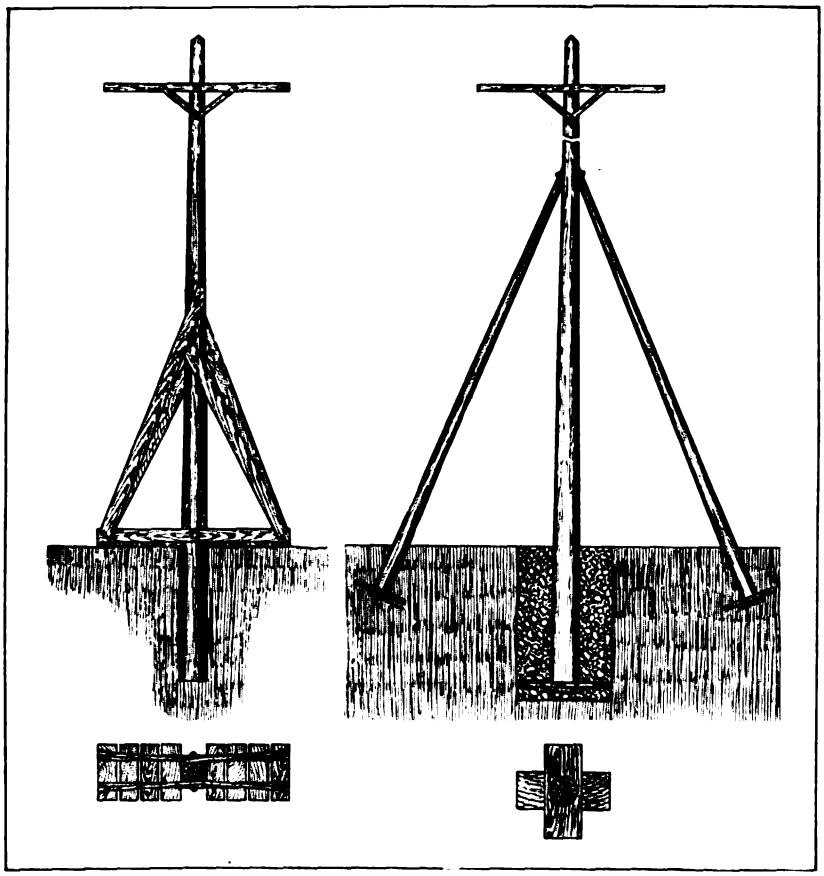

Fig. 654.

GROUNDING OF CENTRAL OFFICE BATTERY.—(655.)

Will you explain the reason for grounding the central office battery? F. J. C.

The grounding of the central office battery assists in preventing inductive disturbances on the line. It is also valuable to provide a point of constant potential to prevent stray currents from varying the potential at junction points. If the potential at a junction point is varied it causes a corresponding current to pass through every piece of apparatus connected to wires leading from the distributing point affected. In the case of transmitter circuits, for example, any variation in the potential at the fuse board is observable on all circuits and may produce serious annoyance. Another advantage lies in the protection of the battery from currents of high potential which might reach its terminals from an outside source.

JACK PER STATION SYSTEM.—(656.)

Is the plan of having a multiple jack for every station on party lines used extensively? F. C.

The use of a multiple jack per station is increasing in popularity in certain quarters. For two, four and ten party lines with semi-selective ringing the use of two jacks per line is common. In this case experience seems to indicate that the saving in ringing keys and time of operators more than offsets the extra expense of providing the jacks.

BUSY LAMPS.—(657.)

In the last issue of THE AMERICAN TELEPHONE JOURNAL it is stated that it is standard practice to connect 42-volt busy lamps on a 36-volt circuit. Will you kindly explain the reason for this? C. R. E.

Busy lamps are used in connection with the line multiple jacks in a toll board. Each toll line is normally connected to a multiple jack in front of each operator, and a busy lamp is associated with each lamp. As soon as the toll line is in use for the transmission of a message all the busy lamps for that line are illuminated and continue to burn until the connection is taken down. In this manner the condition of the line can be observed at a glance.

It is evident that if the lamps were supplied with the full voltage for which they are rated they would burn very brightly, and as each lamp is lighted for a considerable time and several adjacent lamps may be burning together, the amount of heat generated in a strip might be sufficient to soften the insulation in the mounting. On account of this the lamps are designed to reach their full brilliancy on a circuit of higher voltage than that on which they are intended to be connected.

USE OF PHANTOM LINES.—(658.)

I should like to know whether phantom lines such as you explained in a recent query, are being used extensively, or are still regarded as an experiment. A. R. L.

The phantom arrangement is being widely used in places where there are existing circuits which may be adapted to this form of circuit. It is necessary that the two lines should be similar and exceptionally well balanced and well insulated. The apparatus is simple and the question of installation is determined largely by considerations of economy in the handling of a known amount of traffic. In a case where there are periods when the amount of business is at times too heavy for the regular circuits, but not steady enough to justify an additional line, a phantom is the proper thing.

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FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—Second-hand telephones. State make of magneto, transmitter, receiver, style of backboard, time telephones have been in service. Address LaFayette Telephone Co., LaFayette, Indiana. 536

WANTED—Good second-hand 100 drop magneto switchboard with 50 or more drops installed. Must be in good condition and cheap for cash. Address Plymouth Telephone Co., Plymouth, N. C. 537

WANTED—One second-hand Sterling magneto switchboard. Give description, price and time in service. Address LaFayette Telephone Co., LaFayette, Indiana. 541

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Experienced telephone men of good appearance and address as traveling inspectors for the Engineering Department. We need men to fill vacancies caused by recent promotions. Address George J. Yundt, Engineer, Southern Bell Telephone & Telegraph Company, Atlanta, Ga. 530

A SQUARE deal is what we aim to render both employer and employee, when seeking the right man for a place, or the right place for a man. Without effort on your part, without endangering your present position, and without using your employers' time, we hunt up the position for which you are best qualified. Let us find the positon for you. Hapgood's, Suite 511, 309 Broadway, New York City. 464

WANTED—First-class salesman, calling on the telephone trade, can make big money by selling the best specialty on the market. Address Box 535, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 535

WANTED—Continued

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DRAUGHTSMEN—Large Eastern telephone company requires several young draughtsmen who letter well, as tracers and designers on circuit, map, equipment, cable and general draughting. State age, education, experience and salary expected. Enclose a sample of your free hand lettering and of your draughting. Address Box 527, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 527

POSITION WANTED—Designer and model maker on telephone or other apparatus wishes position with a concern which appreciates a man that can do good work with his hands and brain. Address Box 539, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 539

WANTED—Position as Chief Solicitor or in the Accounting Department, by thoroughly experienced man of 35. Western states preferred. Address Box 540, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City 540

WANTED—Telephone salesman. A large telephone supply house located in the Southwest wants a first-class traveling man. As briefly as possible, give experience, references and description. Address Box 542, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 542

WANTED—An active partner with some money to put in a good paying telephone business. Owner is forced to take this action because of lack of capital to carry on rapidly expanding business. Address Box 543, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 543

WANTED—**Position to construct a new telephone plant** for an Independent company, of from 500 to 2,000 subscribers, with the prospect of superintending the plant and exchange after it is in operation. I am experienced in the business management as well as in the technical and construction part. Understand handling the general public. Have had fourteen years' experience in the business. Married and sober. Any company in need of a man in this capacity kindly address Box 318, Schenectady, N. Y. 544

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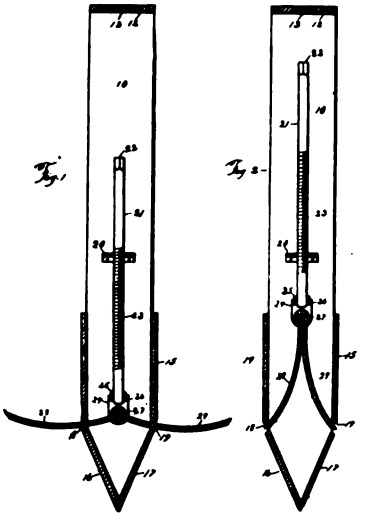
TELEPHONE PATENTS

ANCHOR POST.

Richard Wiltse, Grand Junction, Iowa, patents (No. 809,879, dated Jan. 9, 1906; filed Jan. 28, 1905; serial No. 243,590) an anchor post.

The object of this invention is to provide an anchor post which can be readily installed or removed. For this purpose the inventor employs two oblong members, 10, 11, which are joined together at the top by a plate 12, and at the bottom by a V-shaped



member 16, 17. Between the parts 14, 16 and 15, 17 are openings 18, 19, through which the arms 28, 29 may be thrust as shown in Fig. 1. The movement of these arms is controlled by a shaft 21 supported by a bracket 20 having a screw threaded hole which engages the threads 23 of the shaft. The anchor arms are pivoted at 27.

In operation the anchor post is driven into the ground at the proper angle. A crank shaft is then introduced through hole 13 and engages the top of shaft 21. The crank is then rotated, which causes the depression of the shaft, and the arms are forced outwards. When in the correct position the crank is removed. If at any future time it is found desirable to remove the anchor post the crank is employed to draw the arms into the post, when the latter can be readily withdrawn.

SELECTIVE PARTY LINE SYSTEM.

William M. Bruce, Springfield, Ohio, patents (No. 806,950; dated Dec. 12, 1905; filed April 3, 1905; serial No. 253,700) and assigns one third to James S. Brailey, Jr., Wauseon, Ohio, and one-third to Charles D. Juvenal, Springfield, Ohio, a selective system for party line telephones.

In this scheme the inventor shows a means whereby the controlling magnets of a selector mechanism may be operated without interference with the talking circuits. Each substation is provided with two magnets, one to operate a selector mechanism, the other to release it. Battery at the central station can be sent out over either or both sides of the lines to ground at will, and thus the mechanism may be operated.

LIGHTNING ARRESTER.

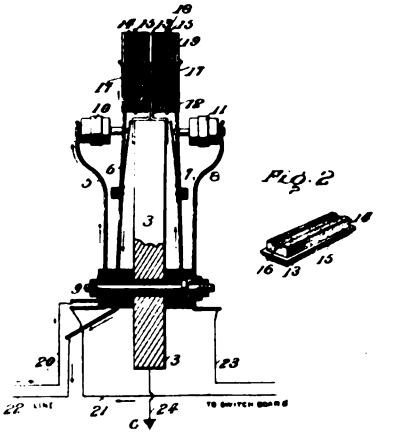
Frederick A. Stafford, Chariton, Iowa, patents (No. 808,882, dated Jan. 2, 1906; filed April 3, 1905; serial No. 253,605) a lightning arrester.

This arrester is intended for bridging lines only and is of the cut-out type. A switch is provided by means of which the instrument can be connected to the line or short-circuited to ground. A spark gap arrester is also employed. In general use the instrument is mounted on the outside of a building, and a rod with a handle which is employed to actuate the switch extended through to the inside. When the switch is in position to short-circuit the instrument any party attempting to signal will be made aware of the fact by the failure of his bell to ring, and would then move it into position to connect the instrument to the line wire.

CARBON PLATE FOR PROTECTIVE DEVICE.

Greenleaf Whittier Pickard, Amesbury, Mass., patents (No. 807,962, dated Dec. 19, 1905; filed April 14, 1904; serial No. 203,159: also a sub-division of the above, No. 807,963; dated Dec. 19, 1905; filed Dec. 21, 1904; serial No. 237,851) and assigns to the American Telephone and Telegraph Company of New York a protective device.

These patents disclose improvements in the manufacture of



the carbon blocks used for the discharge of high pressure currents which will prevent the formation of dust which tends to short-circuit the normal air gaps when a discharge takes place. This the invention accomplishes by immersing the blocks for thirty minutes in a solution of 1.4 pounds of resin to 4 gallons of turpentine at a temperature of from 150° to 160° Fahrenheit. This temperature is necessary to render the solution highly fluid. The blocks are then removed, drained and dried in air at a temperature of from 150° to 160° Fahrenheit for twenty-four hours, thereby evaporating the turpentine and leaving the resin as a binding material. After drying the carbons are ground in the usual way to remove the film and to leave a rough surface.

It has been found that blocks so treated do not leave a dust deposit after a discharge has taken place. The diagram shows the conventional arrangement for lightning protection, 17 being the fusible globule covered by patent No. 438,788 intended to fuse and short-circuit the air gap when subjected to the passage of continued discharges. The carbon plates 13, 14 are separated by the mica plate 15. This plate, of course, only partially covers the surface of the carbons, and it is to prevent the separation of dust from the exposed portions of the inside surfaces that this treatment is applied.

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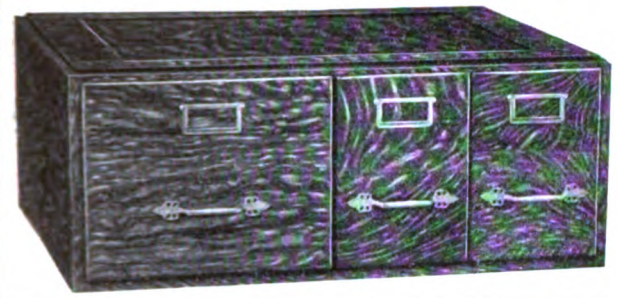

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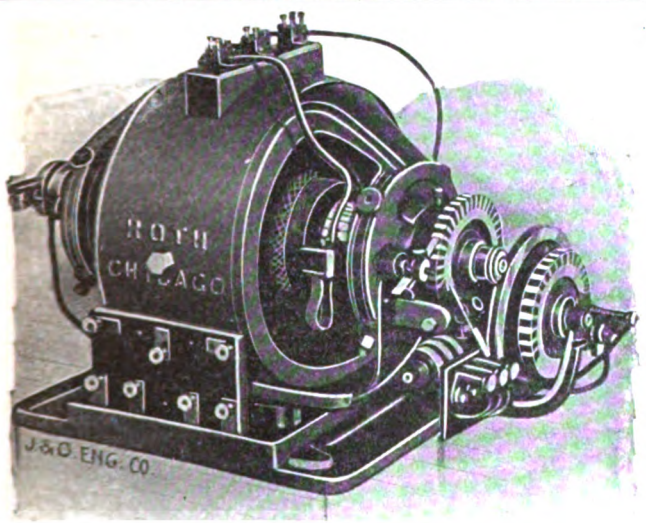

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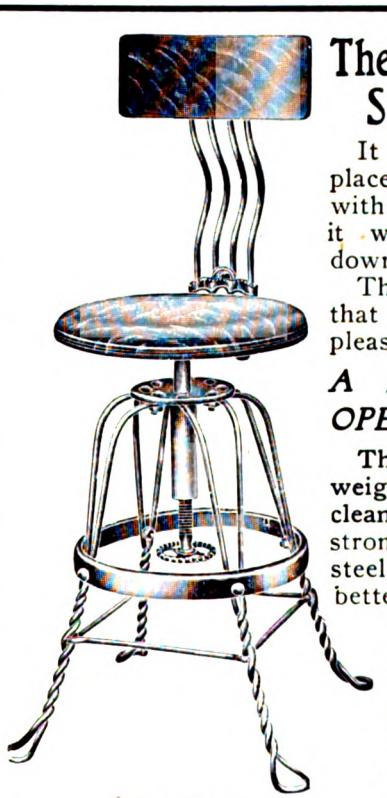

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A NEW CABLE GRIP.

THE cable grip which is illustrated on this page presents advantages which should make it appeal forcibly to managers desirous of effecting economy in the drawing in of cables. This device is capable of being quickly adjusted to cable, and special designs provide for its use under varying conditions which arise in practice. After the grip has been applied to the cable, the application of tension draws the net work of wires over the surface so tightly that the manufacturers claim that slipping is impossible. At the same time the strands distribute the pressure over the surface of the sheath in such a way as to avoid any compression of the covering, with consequent lowering of the insulation. The device may be quickly applied to the end of the cable for ordinary work in drawing in. A feature which is valuable in this connection is a leather collar protector which may be fitted to single eye grips. Many conduits contain more or less sand, cement or grit, which tends to wear the grip, especially near the neck, and the use of this leather collar prevents this wear and increases the life of the parts.

For pulling out cable, or pulling in slack, the double eye grip is very useful. One form of this grip has been devised to open at the side, in order that it may be placed without cutting the cable. An illustration of this device in use is shown in Fig. 3. When the grip is applied to the cable the pole is used as a lever to draw out the cable gradually. The release of pressure causes the net work to slacken, and it may be readily pushed further along the cable to obtain a new hold.

As all the wires are carried around the ring the tension is evenly distributed, and there is no possibility of the wires pulling out or breaking from having to bear an undue proportion of the tension. The prices for this device are so low that its use is claimed to be extremely economical. In addition to the advantages derived from its applicability to many conditions which are imperfectly met by ordinary means, the rapidity with which it is adjusted will produce a considerable saving in labor on almost any class of work. It is useful not only for handling underground work, but it is especially recommended for use on aerial cable, which has to be drawn around corners, and on long pulls. This appliance is manufactured by the Universal Cable Grip Company, P. O. Box 390, Syracuse, N. Y., which will be pleased to furnish further information and prices to all persons interested.

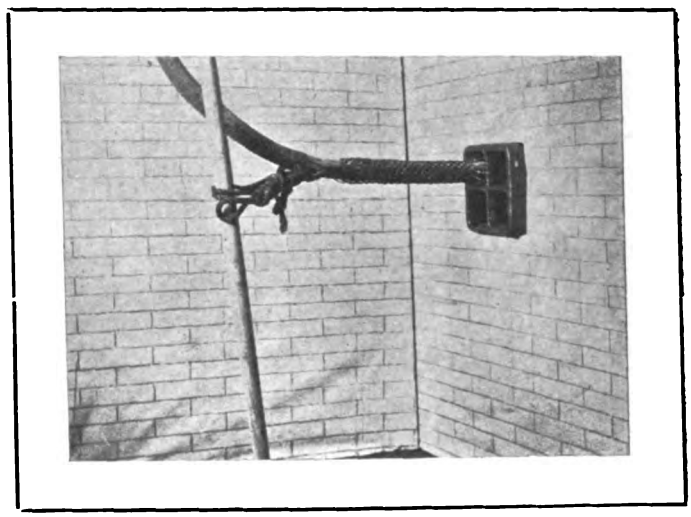

Fig. 3. Arrangement for withdrawing cable from manhole.

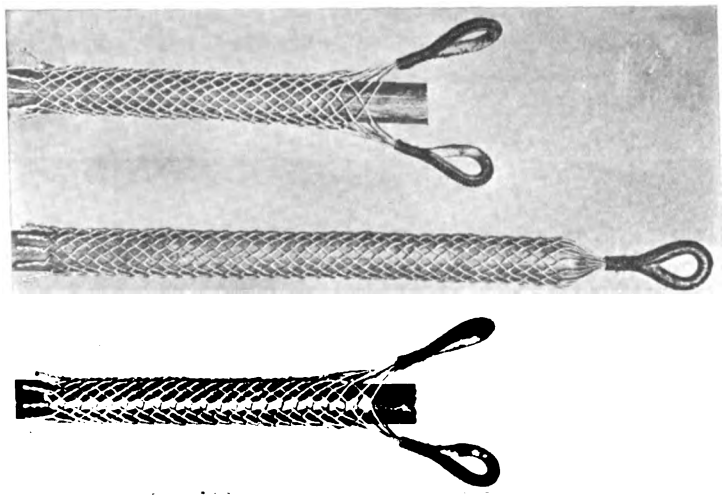

Fig. 2. Detail showing attachment of single and double eye grips.

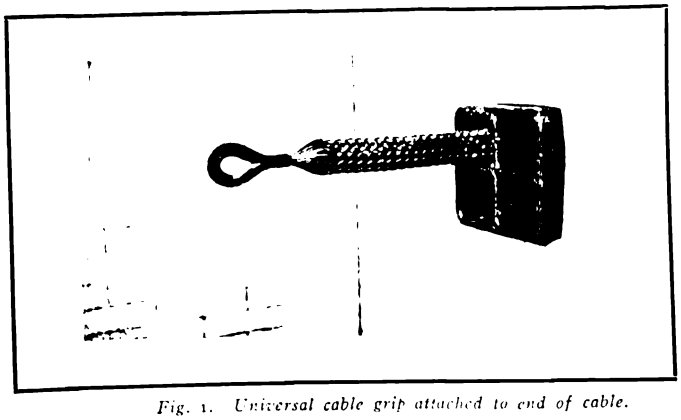

Fig. 1. Universal cable grip attached to end of cable.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, St. Louis, Mo., is distributing the second of the series of very attractive monthly postal card calendars. All parties desiring to receive these cards from month to month are requested to send in their name, so that they can be placed on the mailing list and receive cards throughout the year.

THE BELDEN MANUFACTURING COMPANY, Chicago, Ill., is distributing its 1906 catalogue to the trade. Copies can be secured by addressing the firm and any further information will be cheerfully furnished by it. There are eight pages of wire tables. These will be found of great value in determining weight, length, resistance, etc., of any gauge wire. Amongst the different articles listed are copper wire, bare and insulated for magnet purposes, German silver wire, self-fluxing solder, switchboard wire, jumper wire, gas fixture wire, winding machines, revolution registers, flexible cords of all descriptions, terminal tips, and braided cotton sleeving. It is stated that separate electrical and chemical laboratories are maintained by the company under expert supervision and all raw material is subjected to severe tests before it is accepted. A coil winding department is at the disposal of the firm's customers and it will be pleased to quote prices. The catalogue contains much information not usually found in similar books.

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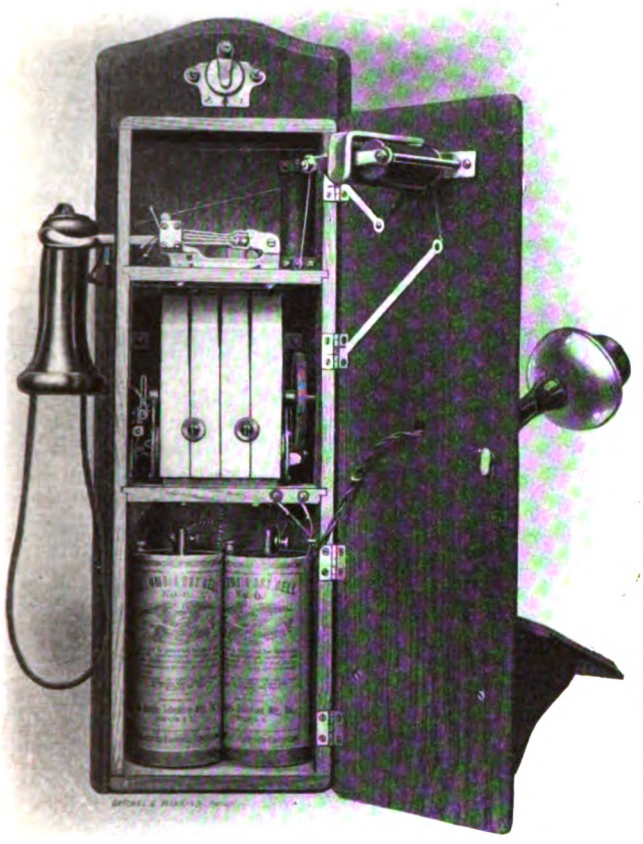

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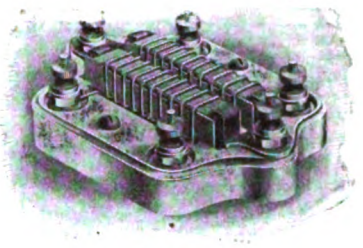

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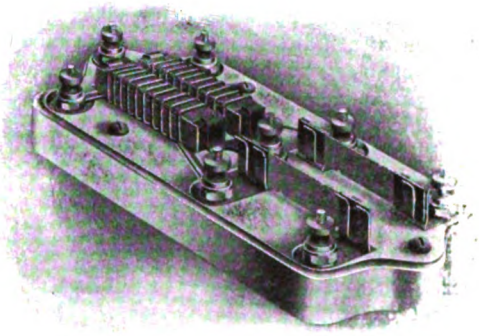

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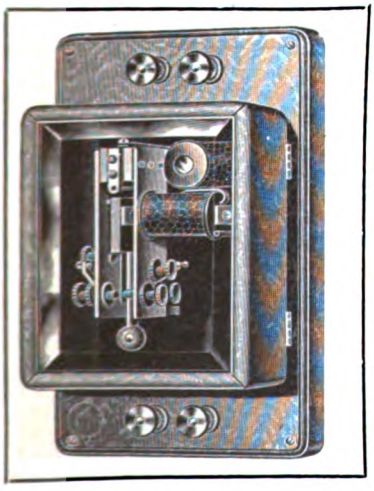
To Those of Our Customers Who Have Already Inquired and Those Who May Desire to Know:



That the Sandwich Pole-Changer, "while its appearance in the cut is strikingly similar to the Illinois," it is a very different and much better instrument. The Sandwich Pole-Changer Company is not the successor of the Illinois Electric Specialty Company. They simply purchased the tangible property of the Illinois Company last June, who had been doing business at a loss for several years, and this is the reason why *their suit went by default.*

The Sandwich Pole-Changer was put on the market by E. C. Hennis, who employed the most careful and able Patent Attorneys to see to it that this instrument was absolutely non-infringing, and it infringes no patent, then or since issued on Pole-Changers.

The Sandwich Pole-Changer Company is strongly backed financially, and is placing these instruments on the market by the hundred each month, and will protect the interests of its customers and users, as well as its own, to the end.

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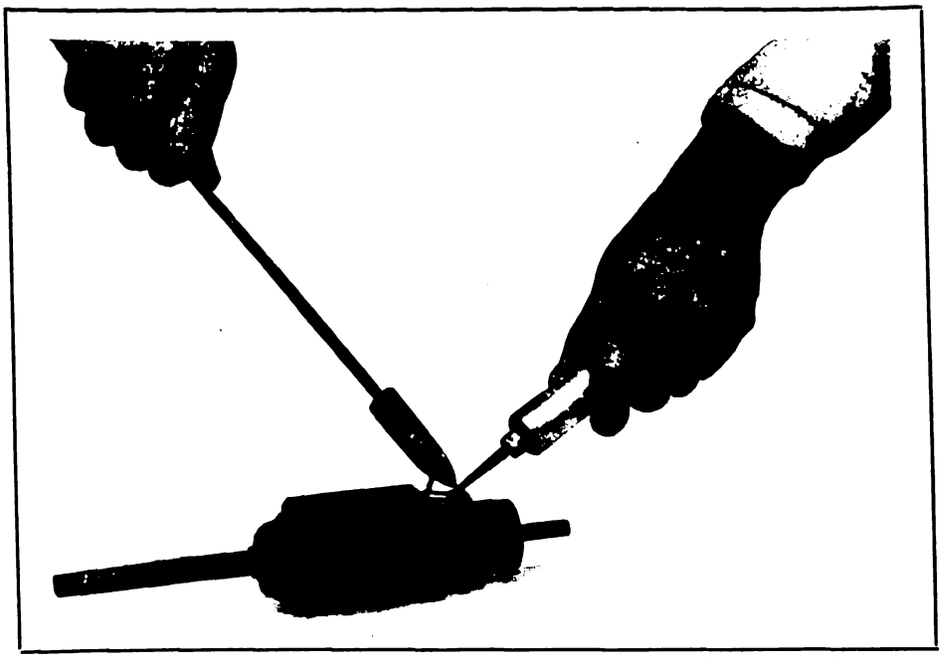
IN THE MANUFACTURING FIELD

AN ECONOMICAL SOLDERING DEVICE.

THE annoyance and loss of time resulting from the use of a soldering paste contained in an ordinary flat box are familiar to all telephone men. In order to do away with the difficulties experienced in using a separate instrument for picking up the paste and applying it to the surfaces to be connected, a tubular solder has been made, with the flux contained within the tube, and used with some success. The Climax Manufacturing Company, of Boston, Mass., has devised a method of overcoming this difficulty which may be seen at a glance to be extremely satisfactory in operation, and which it claims is more economical than the use of a tubular solder. The flux or paste is contained within a tube with collapsible walls, and can be squeezed out through the opening of the tube, and directly applied to the surface upon which the solder is to be placed. The application of a heated copper causes the flux to melt and flow evenly over the surface as it is forced from the tube.



Application of Soldering Paste to an Armature Winding Connection With Climax Tube.

Amongst the important advantages claimed for this method of procedure is the fact that it is a very easy matter to squeeze out just the right quantity of flux, and apply it to the proper point on the work in hand with a single motion. The troubles which come from the use of too much paste are also easily avoided, and the disadvantages observed when a box of paste is left open on a bench, due to the accumulation of dirt, or the daubing of tools which may accidentally come in contact with the uncovered surface of the paste, are done away with.

This tube may be carried in the pocket ready for instant use, and this is of marked advantage when wires are to be soldered overhead. The company claims that the paste used in the tubes is of exceptionally good quality, and non-corrosive.

An interesting mechanical detail embodied in this apparatus is the aluminum tube. This allows of the paste being applied directly to the joint while the joint is heated, without soldering up the vent. The manufacturers will be pleased to furnish additional information and prices upon receipt of requests.

THE BAIRD MANUFACTURING COMPANY, 6 Michigan street, Chicago, reports that the Hanamo Telephone Company, of Maitland, Mo., is installing the Baird secret-service system on its party lines. The Hanamo Telephone Company, of Marysville, Mo., is also installing this system.

ALBERT J. COX, Suite 1,214 Chicago Stock Exchange Building, Chicago, Ill., is distributing a pamphlet descriptive of his business as a purchasing and distributing agent. The pamphlet is entitled "Economy of Buying." His work is stated to be the reducing of cost of raw and finished materials to the telephone companies, made possible by the buying of large quantities at one time. Mr. Cox was for years associated with the Western Electric Company and the experience gained has enabled him to purchase materials which will conform with standard specifications.

THE ELECTRIC GAS LIGHTING COMPANY, BOSTON, CHICAGO, TORONTO AND SAN FRANCISCO, is attracting considerable attention to its line of interior telephones by a series of mailing cards, each of which is used to convey some very pointed paragraphs respecting interior systems. This firm manufactures several different types, each of which is suitable for some particular work. In every case the apparatus has been designed for hard usage without the necessity of frequent repairs. The company will be pleased to place the names of parties interested on its mailing list, whereby they will be able to receive all bulletins, cards, etc., immediately after publication.

THE ROCK ISLAND BATTERY COMPANY, Cincinnati, Ohio, had the misfortune to lose its entire plant by fire on Jan. 11. The only articles saved were the books and records. While the fire was still in progress, a meeting of the directors was held and it was decided to at once start operations on a larger scale. On the 13th a new factory building at Ninth and Sycamore streets was leased and the work of installing new machinery commenced at once. So rapid was the progress of reorganization that the firm announces its ability to make deliveries of the Rock Island dry cell at the present time. It is now in a position to handle a much increased business, and on account of enlarged machinery can make very quick deliveries. The company will be pleased to quote prices and furnish further particulars upon request.

MR. E. H. VALENTINE, president of The Valentine-Clark Company, Chicago, dealers in cedar poles, etc., in pursuance of a resolve made many years ago to retire from active business at his present age, has disposed of his interests in that company to Mr. E. L. Clark, formerly secretary and treasurer. Mr. Clark now succeeds to the office of president, the corporate name of the company continuing as heretofore. The Valentine-Clark Company has long occupied a prominent position in the cedar industry and enjoys an extensive volume of business in all lines of electric construction requiring the use of poles for power transmission. Mr. Clark has been identified with the company since its formation, enjoys an extensive acquaintance with producers and consumers, and possesses an intimate knowledge of the trade in all its details.

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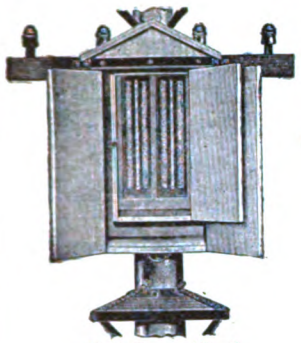

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Two compartments, both with doors closing against shoulder. Cable and spider wire enter from bottom. They are cabinet made, by Machinery, and prices can not be duplicated by hand work. Nothing cheaper on the market. Made in eight sizes.

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NEW PATENT
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I sell the Rubber Covered Telephone Wires and Cables made by the Marion Insulated Wire and Rubber Co.

I can deliver promptly at the lowest prices.

I. A. BENNETT
141 South Glinton Street
GHIGAGO

THE VALUE OF A MEASURING INSTRUMENT

Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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FINANCIAL.

BENSON, ILL.—The Benson Telephone Company has increased its capital stock to $12,000.

COUNCIL BLUFFS, IA.—The Council Bluffs Telephone Company has increased its capital stock from $100,000 to $500,000.

NEVADA, IA.—The Mutual Telephone Company has declared a dividend of 2½ per cent.

LEXINGTON, KY.—The Fayette Home Telephone Company has declared a quarterly dividend of 1½ per cent. on its preferred stock.

CADILLAC, MICH.—The Missaukee Telephone Company has increased its capital stock from $5,000 to $20,000. In addition to the regular quarterly 2 per cent. cash dividend, a special stock dividend of 6 per cent. has been declared. The company is to purchase the Lake City Telephone Exchange, now owned by N. N. Peck and G. S. Stout. Officers of the company are: H. S. Lamb, president; Fred Rose, vice-president; N. N. Peck, secretary and treasurer; G. S. Stout, general manager.

MARQUETTE, MICH.—The Sagola (Dickinson County) Telephone Company has declared a dividend of 5 per cent. The officers of the company are as follows: J. J. Clark, president; Paul de Champlain, vice-president; T. J. Dewish, secretary and treasurer.

DENTON, MD.—The Farmers' and Merchants' Telephone Company has increased its capital stock to $25,000.

AUSTIN, MINN.—The Interstate Telegraph and Telephone Company has increased its capital stock from $20,000 to $30,000.

CLEARWATER, MINN.—The Clearwater Telephone Company has declared a dividend of 10 per cent. for the year 1905.

MINNEAPOLIS, MINN.—The directors of the Twin City Telephone Company have declared the sixteenth quarterly dividend at the rate of seven per cent. per annum on the preferred stock.

WAYNE, N. Y.—The Wayne-Monroe Telephone Company has declared a dividend of 1½ per cent. on its capital stock.

ASHLAND, O.—The Star Telephone Company has declared a dividend of 6 per cent. The company has exchanges in twelve other places besides Ashland.

CRIDERSVILLE, O.—The Cridersville Telephone Company, Cridersville, has increased its capital stock from $5,000 to $25,000.

WEST UNITY, O.—The Citizens' Telephone Company, of West Unity, has increased its capital stock from $50,000 to $60,000.

FRANCHISES.

STEPHENS, ARK.—Messrs. T. A. and G. Lewis have been granted a franchise to construct a telephone system at Stephens.

WYMORE, NEB.—The city council of Wymore has granted to Frank M. Smith a franchise for an Independent telephone system. A modern plant will be installed, and toll lines built to connect with the Home Telephone Company's exchange at Beatrice, Neb.

PEOLI, O.—The Peoli & Gilmore Telephone Company has been granted a franchise to construct a telephone system.

SUNNYSIDE, WASH.—The Independent Telephone Company has applied for a franchise at Sunnyside.

COMBINATIONS.

FERTILE, MINN.—The telephone line to Bermidji from Fertile has been sold by the Fertile Telephone Company to the Polk County Telephone Company. The new company intends to build several new lines.

OSCAR, MINN.—The Oscar Telephone Company is to connect with the Barb Wire Telephone Company at Carlisle.

KAHOKA, MO.—The Hubinger telephone plant in Kahoka has been purchased by Thomas Peebles of Minnesota, and the name changed to the Gate Telephone Company. The plant will be put in first class condition.

WORCESTER, N. Y.—The Davis and Rose Telephone companies have consolidated and in the future will be operated under one management. The company is not yet named. It is capitalized at $30,000. Under the new management the Worcester Exchange will be rebuilt and rural lines run to Decatur, South Valley, East Worcester and other points.

CALDWELL, O.—The Caldwell Independent Telephone Company, of Caldwell; the Farmers Telephone Company, of Caldwell; the Summerfield Telephone Company, of Summerfield, three of Noble County's telephone companies, with a combined business of 1,000 telephones, have consolidated and will be operated under the name of the Noble County Telephone Company.

CENTERVILLE, PA.—The Home Mutual Telephone Company of Centerville, and the Home Union Telephone Company of California have made connections and are giving service over each other's lines.

ELECTIONS.

NASHVILLE, ILL.—The Nashville Mutual Telephone Company has elected the following officers: President, Jos. McDowell; vice-president, Fred Stark; secretary, Garfield Law; treasurer, Frank Meyer; trustee, Ben Meyer.

PITTSFIELD, ILL.—At a recent meeting of stockholders of the Farmers' Telephone Company H. T. Shaw, of Martinsburg, was re-elected president and J. F. Lacy secretary.

BICKNELL, IND.—The Bicknell Telephone Company has re-elected all its old officers, as follows: President, Joseph Barr; manager, W. D. Lemen, Treasurer, Frank McClure; secretary, John Hoover.

BORDEN, IND.—The Farmers' Union Telephone Company has elected the following officers: J. G. Scott, president; Walter Scott, vice-president; Jefferson Johnson, secretary; George L. McCutcheon, treasurer.

COLUMBUS, IND.—At the annual meeting of the Citizens' Telephone Company, Thomas D. Sheerin was elected president; C. S. Norton, vice-president; M. S. Hosea, secretary and treasurer. The old board of directors was re-elected.

DILLSBORO, IND.—The Dillsboro Telephone Company has elected the following officers: F. M. Sale, president; Geo. P. Heffelmeyer, vice-president; Fred Lubbe, secretary, and G. H. Elderbrook, treasurer. A modern plant will be established.

MULBERRY, IND.—Stockholders of the People's Co-operative Telephone Company, at their annual meeting elected the following officers: President, Allen Troxell; secretary, George H. Miller; treasurer, James M. Sims. The company now has more than 400 subscribers, with many on the waiting list.

PRINCETON, IND.—The Independent Telephone Company has elected the following officers: R. N. Parrett, president; J. W. Ewing, treasurer; C. F. Stevens, secretary; F. R. Parsons, manager.

RICHMOND, IND.—The annual election of officers for the Richmond Home Telephone Company occurred January 24, resulting in the selection of A. C. Lindermuth, president; E. H. Gates, vice-president; J. W. Moore, secretary; W. P. Orr, L. M. Flesh, and W. M. Bailey, directors. During the past year there was an increase of 300 subscribers, bringing the number up to 5,000. A proposition to consolidate all the Independent companies in Wayne county was discussed at the meeting and it is probable that such action will be taken soon.

NEW COMPANIES.

GRIDLEY, ILL.—The Fifer Telephone Company, of Gridley, has been incorporated with a capital stock of $1,800. Incorporators: C. F. Hobbler, Alexander Helbing and William Killian.

KINSMAN, ILL.—The Kinsman Independent Telephone Company has been incorporated with a capital stock of $2,500. Incorporators: W. D. Lindsay, Thomas Drinan and E. J. Phelan.

PALOMA, ILL.—The Central Exchange Telephone Company has been incorporated with a capital stock of $2,500. Incorporators: J. B. Henry, O. H. Lawless and Joseph Dickhut.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

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WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

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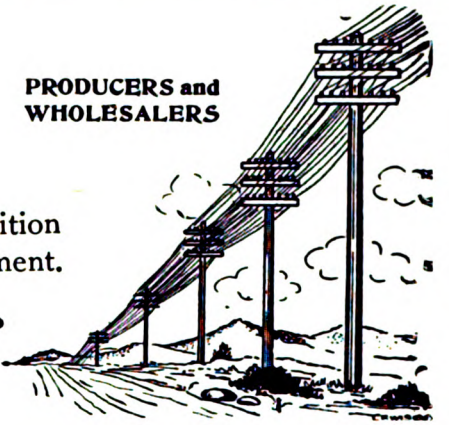

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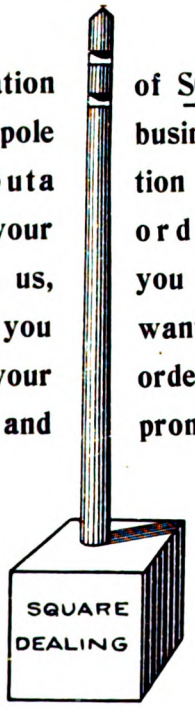
We solicit your orders and can please you in quality and prompt shipments.



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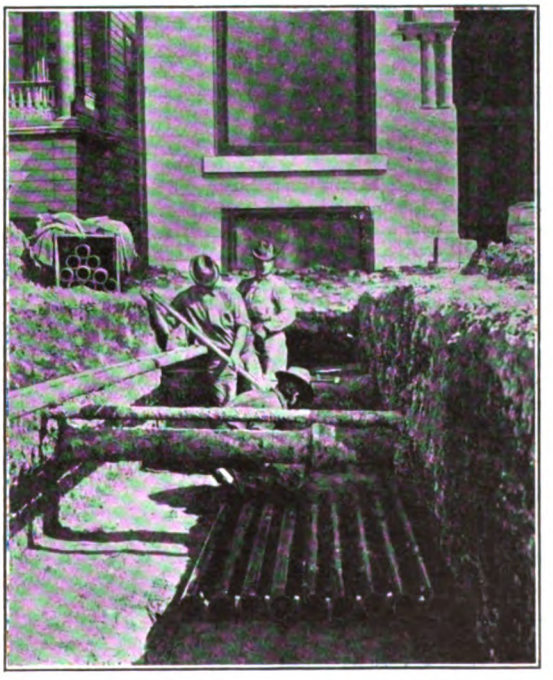

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THE WEEK'S MESSAGES

PRIMGHAR, IA.—The Primghar & Center Township Telephone Company has been incorporated with a capital stock of $500. Incorporators: J. C. Mies and others.

ROCK VALLEY, IA.—The Klein Rural Telephone Company has been incorporated with a capital stock of $2,000. Incorporators are J. E. Quintan and others.

GARNETT, KAS.—The Garnett Telephone Company has been incorporated with a capital stock of $25,000.

WEST COMANCHE, KAS.—The West Comanche Telephone Company has been organized and will build a line to Ellinwood.

BERNICE, LA.—The Bernice Telephone Company has been incorporated with a capital stock of $5,000.

LEONARD, MICH.—The Leonard Telephone Company has been incorporated with a capital stock of $2,500. The principal stockholders are G. B. Dewey and W. G. Poole, of Oxford, and Geo. E. Snyder, of Ovid.

TRUMAN, MINN.—The Armstrong Telephone Exchange Company has been incorporated with a capital stock of $100,000. The officers are: W. L. Hoover, president; John Robinson, vice-president; R. O. Armstrong, secretary and treasurer.

INVALE, NEB.—The Farmers Creek Telephone Company has been incorporated with a capital stock of $3,500. The incorporators are I. O. Walker, C. L. Olmstead and others.

PERRYSBURG, N. Y.—The Perrysburg Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are B. H. Graves, A. W. Powers, Perrysburg; D. L. Stafford, Gowanda.

CLARIDON, O.—The Claridon Telephone Company has been incorporated with a capital stock of $5,000. Incorporators: A. A. McNish, H. D. Morgret, Eugene L. Wilmot, N. J. Wilmot and A. L. Bruce.

CLARKSFIELD, O.—The Clarksfield Telephone Company has been incorporated with a capital stock of $9,500. Incorporators: E. E. Rowland, Dennis Ross, John McDonald, F. E. Meeks, C. A. Whitney and S. C. Helfner.

FISHER, O.—The Farmers Telephone Company, of Fisher, has been incorporated with a capital stock of $2,500. Incorporators: N. Dalton, R. M. Patterson, J. O. Harner, H. D. Hooper and Julian Gift.

HASKINS, O.—The Haskins Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are H. A. Twining, L. A. Challen, H. J. Johnston and F. W. Heald.

WASHINGTON, O.—The Washington-Brady Telephone Company has been organized with the following officers: President, H. M. McCracken; secretary, C. W. Stockdale; treasurer, J. J. Griffith.

PERSONAL.

JOHN FULLMER, of Portage, Wis., has taken charge of the Kilbourn Inter-County Telephone Company's plant, and will have full management.

WILLIAM McCALL has been appointed vice-president and general manager of the New Cambria Telephone Company at Salina, Kas.

R. S. SKILCH, Montreal, has been appointed consulting engineer for the municipal telephone plant the town will build at Edmonton, Alberta, Can.

J. T. TURNER, formerly manager of the Central Union Telephone Company's exchange in Effingham, Ill., has taken the recently vacated position of manager for the Wabash Valley Telephone Company in the same city.

MISCELLANEOUS.

PARAGOULD, ARK.—Charles A. Miller and associates contemplate organizing a company with $10,000 for the construction of a telephone system.

BLUE RIDGE, IND.—The Blue Ridge Telephone Company is not to be acquired by the Bell Company, as was rumored, but is to make arrangements with the New Long Distance Company, of Indianapolis, to use the latter company's poles for a metallic circuit. The Blue Ridge Company, of which Mr. W. H. Ensminger is the proprietor, is to rebuild the plant and put a new exchange in at St. Paul.

MUSCATINE, IA.—The Trunk Line Telephone Company, whose line extends from Flat Iron Point to Muscatine, is to be incorporated.

TOLEDO, O.—The Toledo Home Telephone Company has installed a new private exchange at The Tavern, the switchboard being equipped with service for about 70 telephones and two trunk lines in the popular hostelry. The company also has contracts for installing a private exchange for the Landerson-Basch Abstract Company and the J. F. Zahm Tobacco Company. The business of the company is increasing at a rapid rate, in the neighborhood of 300 new telephones being installed per month. For the first week in January 70 new contracts were secured, while for the second week of the month 65 new contracts were signed.

New Construction in the Field

MOBILE, ALA.—The Eastern Shore Telephone Company, recently absorbed by the Home Telephone Company, is to have it's system extended and is to make connection with the Independent Long Distance Telephone Company at Bay Ninette.

CORONA, CAL.—The Corona Telephone Company has commenced the construction of its system.

NEWBERRY, FLA.—The East Florida Telephone Company is building a line from Newberry to Taylor.

BORDEN, IND.—The Farmers Telephone Company, of Borden, is extending its lines to Mooresville.

EMERSON, IA.—The Mutual Telephone Company is to build a line from Emerson to Hastings, also one to Glenwood.

LEON, IA.—The Leon Telephone Company is making many improvements in its system.

TAMA, IA.—W. C. Fidler, owner of the telephone plant at Tama, is to make many improvements in the system and contemplates the acquisition of the Toledo exchange.

ELIZABETHTOWN, KY.—The Hardin County Telephone Company is to build a number of new lines and make many improvements.

HINDMAN, KY.—The Beaver-Hindman Telephone Company is extending its line from Hindman to Colson, where connection will be made with the Whitesburg Telephone Company. The Whitesburg Telephone Company's lines are also being extended to all parts of the county.

SHARPSBURG, KY.—The Sharpsburg Telephone Company is extending its lines.

CORINNA, ME.—The Corinna Telephone Company is to extend its lines to Lincoln's Mills.

WEST STOCKBRIDGE, MASS.—The Berkshire Mutual Telephone Company is to extend its lines to Housatonic.

ALLEGAN, MICH.—The Citizens' Telephone Company is running a copper metallic toll line from here to Hamilton to connect with a line from that place to Holland, doing away with the relay service through Grand Rapids.

LAKE ODESSA, MICH.—The Citizen's Telephone Company has completed a new copper line direct to Ionia.

ARROW ROCK, MO.—The Arrow Rock Telephone Company contemplates building a number of new lines.

MESABA, MINN.—The Mesaba Telephone Company, having secured permission to extend its line from Grand Rapids to Deer River, will commence work at once.

CANTERBURY, N. H.—The Boscawen Telephone Company is to build a line to the North Concord Station.

ELLICOTTVILLE, N. Y.—The Ellicottville Home Telephone Company is to build a line to Franklinville, Machias and Arcade.

PITTSTOWN, N. Y.—The Pittstown Telephone Company is to make many extensions to its lines.

ATHENS, O.—The Athens Telephone Company intends to make many improvements to its system.

BELLEFONTAINE, O.—The United Telephone Company is to build new lines out of DeGraff, West Liberty, East Liberty and West Mansfield.

McCOMB, O.—The Mutual Telephone Company is to build a line from McComb to Deshler.

MARIETTA, O.—The Marietta Telephone Company is to spend $50,000 in improving its system.

HARRISBURG, PA.—The United Telephone Company, of Harrisburg, is to build a line between Tamaqua and Mauch Chunk.

REDBANK, PA.—The Redbank Telephone Company has under consideration the building of a trunk line from Summerville to Kingsville, via Crates and Shannondale.

HERMOSA, S. D.—The Hermosa Telephone Company is to build a line from Hermosa to Keystone.

SADLER, TEXAS.—The Grayson County Telephone Company is putting in a line from Sadler south to the main line from Whitesboro to Sherman.

BRECKLETON, WASH.—R. E. Jackson and others are to build a telephone line from Breckleton to Cleveland.

MAZATLAN, MEX.—The telephone system belonging to the company of which Arthur de Cima is the head is to be rebuilt. A special system for the exclusive use of the police, with telephones at various points along the streets, will be installed.

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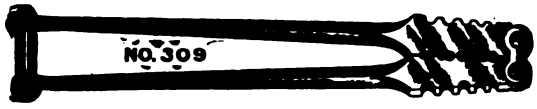

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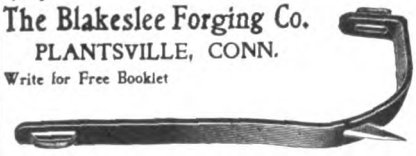

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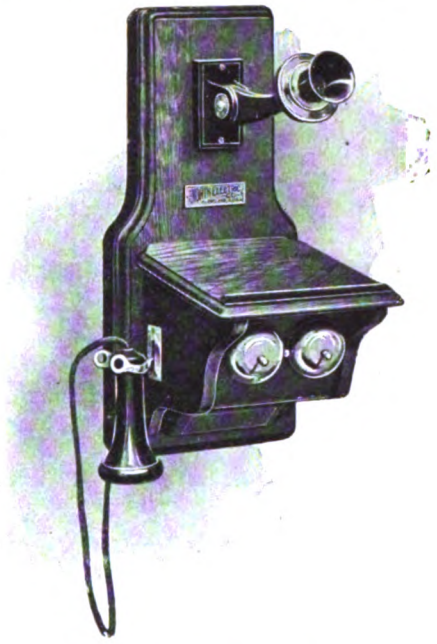

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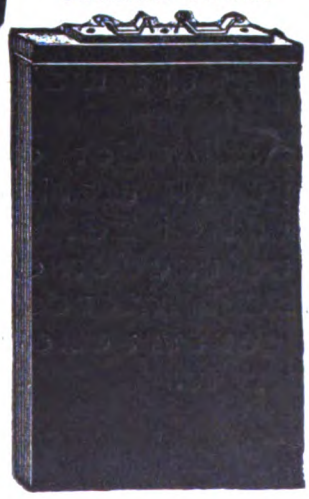

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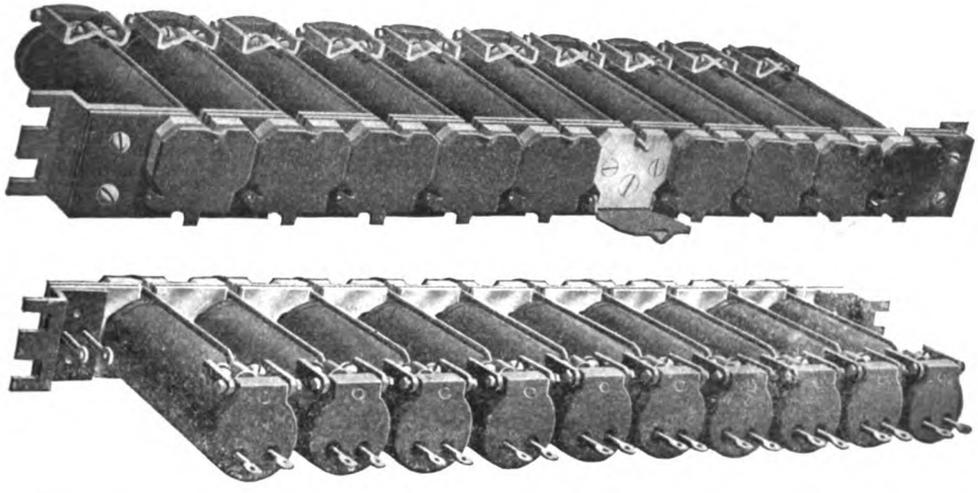

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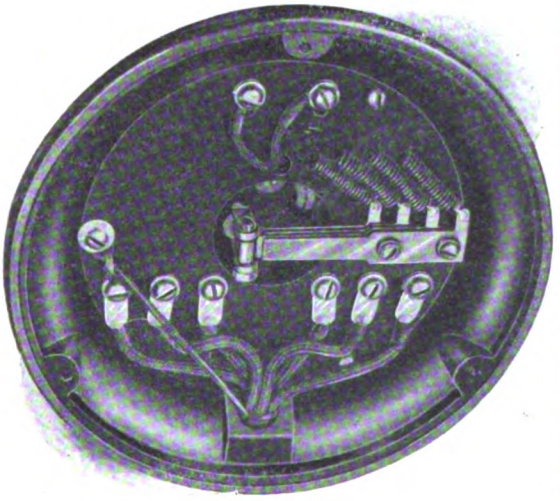
MONARCH APPARATUS

THE DESK SET



All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 1016 SOUTH CLINTON STREET CHICAGO, ILL.

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Patented

TYPE A—10-Pair Hall Cable Box.

CABLE TERMINAL EFFICIENCY.

A great deal of the efficiency of a cable plant depends upon the terminal and distribution facilities. And what is more, the type of terminal is of the greatest importance. Some of the points to be considered in its selection are protection, "getatability," compactness, rigidity. Considering these features collectively or individually you cannot find a terminal on the market that is superior to the HALL. Protection was given the greatest attention in its design so that when you buy a

HALL CABLE TERMINAL

you have bought protection against lightning, sneak currents, or crosses with dangerous circuits. The "getatability" of the Hall is unique. When the cover is taken off the top, bottom, front and back are exposed. No opportunity here for faulty inspection.

Compactness? Just look at the illustration. That tells its own story.

Rigidity? An all-metal framework carries the terminal plate. We couldn't make it stronger if we tried.

Seems to us you ought to get prices. Your name and address will bring them, and some more facts that will be of value to you.

THE MOUNTAIN STATE ELECTRICAL COMPANY,

Sole Manufacturers, WHEELING, WEST VIRGINIA.

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THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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HAS STOOD THE TEST OF TIME

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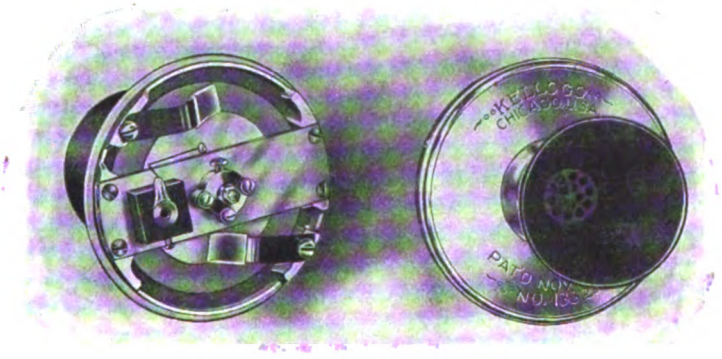

BACK VIEW. FRONT VIEW.

Every telephone company has come to know that the transmitter is the most vital part of the entire system.

If a transmitter "falls down" and has to be exchanged, it is not the financial loss that counts, but it is the dissatisfaction of the subscribers that hurts the telephone company, and this dissatisfaction of the subscribers cannot be expressed in dollars and cents.

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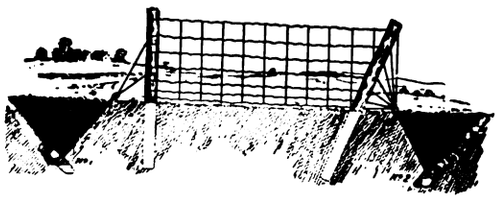

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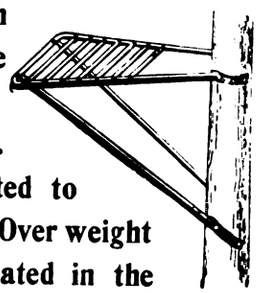

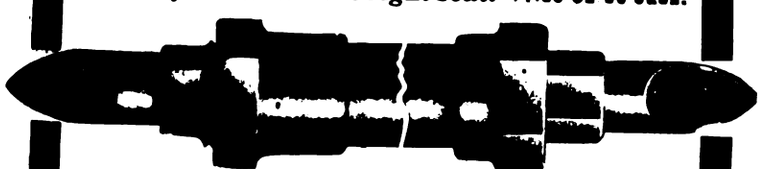

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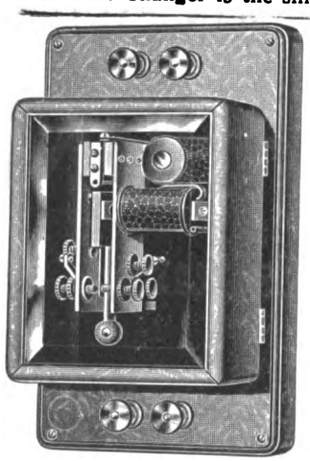
A simple device which accomplishes the same results as a more complex one is certainly more preferable. The Sandwich Pole-Changer is the simplest device ever constructed for ringing purposes. There are but three contact springs and as these engage alternately with their opposite sides they cannot be forced out of position by constant use.



It requires no adjustment, as this is done at the factory and is permanent.

The use of a primary constant current battery to operate the vibrator has been dispensed with; a minute quantity of current, hardly a milliampere, being taken from the ringing battery, through suitable resistance coils for this purpose.

It will work in either a vertical or horizontal position, which permits it being hung on a wall or mounted on a cabinet. Another excellent feature is that it is practically noiseless. There are others which are described in our free booklet. Let us send it to you.

THE SANDWICH POLE-CHANGER CO.

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COMMON BATTERY MULTIPLE SYSTEM

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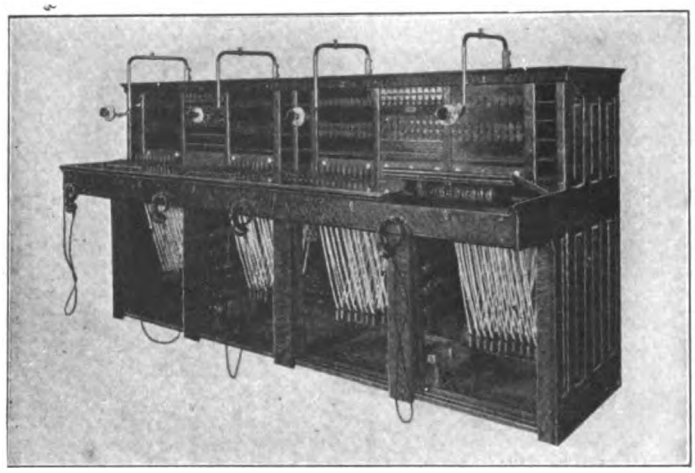

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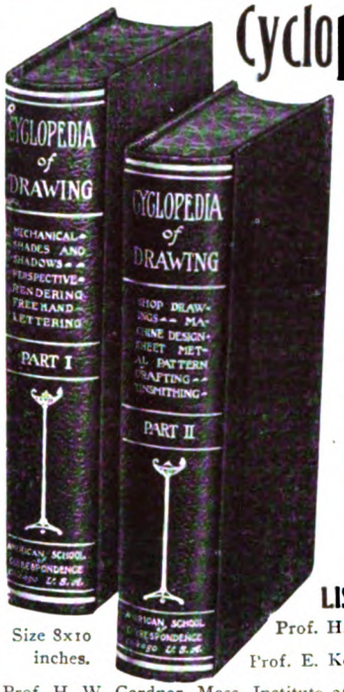

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NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

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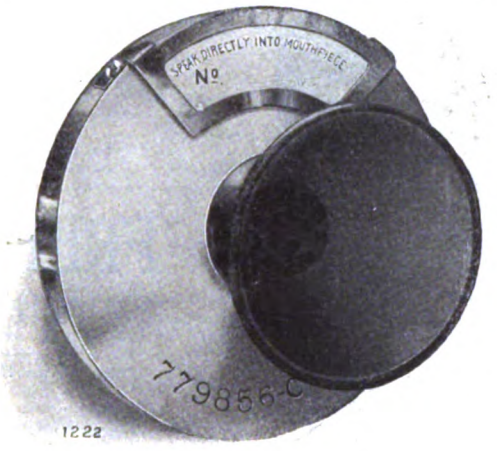
The Stromberg-Carlson Transmitter

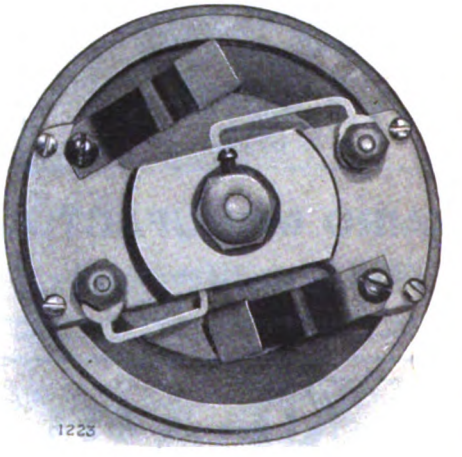


FRONT VIEW Showing Card Holder

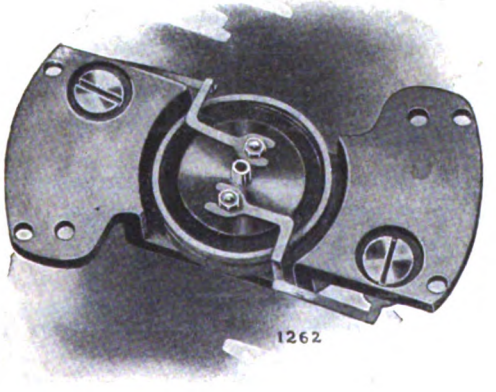
is decidedly different from any other you have ever seen. If you were to try it on a long distance line, then you would notice the difference---that counts.

THE ELECTRODES

are made of carbon, and both are attached to the central point of the main diaphragm. There is thus produced a variation in the distance between the electrodes of twice the amplitude of variation of the central point of the main diaphragm. It is unnecessary to claim a greater volume of transmission than if only one electrode moved.



TRANSMITTER With Back Removed



BRIDGE WITH CARBON CUP Showing Conductor Attached to Each Electrode

We give the transmitter such an adjustment that under ordinary tones of voice the volume is not as loud as some of the forms of sensitive transmitters now on the market. As the voice is raised, however, the volume of transmission from the instrument is multiplied two-fold so that the transmission, when talking in a loud tone of voice, has much more volume than that of any other type. The advantage of this is readily seen.

Let us send you new booklet describing and illustrating this transmitter. It tells the whole story, we mail it free.

Just ask for Booklet No. 91-B.

Stromberg-Carlson Tel. Mfg. Co.

Rochester, N. Y. **Chicago, Ill.**

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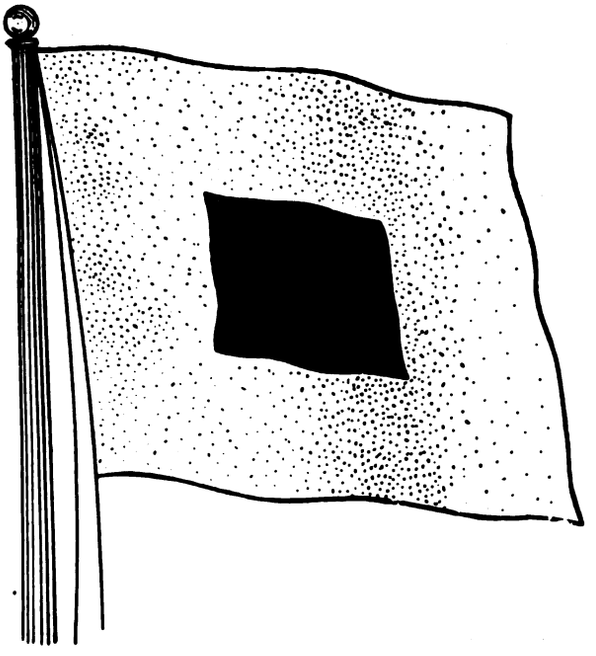
WE MAKE CABLE

CABLE SAVES MONEY

A CABLE-GRAM



OFFICIAL FORECAST

SEVERE STORMS ARE APPROACHING.
THE PRICES OF LEAD CABLE
WILL SOON ADVANCE.

WE ADVISE

all telephone companies to buy cable without delay. Protect your service by substituting cable leads for your open wire lines. We make it, and will furnish attractive prices on application.

Remember, in Cable, it's Quality that Counts

CABLE PAYS DIVIDENDS

STROMBERG-CARLSON TELEPHONE MFG CO.
ROCHESTER, N.Y. CHICAGO, ILL.

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PRODUCERS OF
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SWITCHBOARDS
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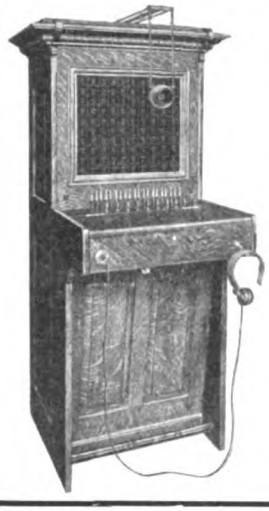
BOTH MAGNETO AND CENTRAL ENERGY



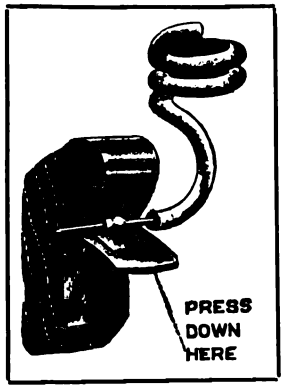
OUR NEW MAGNETO SWITCHBOARD
STYLE "G"
EFFICIENT, DURABLE and GUARANTEED
Each drop self-restoring, sensitive in operation, every part accessible, positive in action, every drop self-contained.
Western Apparatus is Scientifically and Mechanically Constructed

Write for specifications and prices.
Our New Telephone Catalogue "E" now mailing.

Western Telephone Manufacturing Co.
THE PIONEER INDEPENDENT TELEPHONE FACTORY
Established 1893 CHICAGO, ILL.

OFF WITH THE OLD AND ON WITH THE NEW.

Because you have always used the old style screw binding post, is no argument against the new style FAHNESTOCK SPRING BINDING POST. This is a device which is as superior to the regular screw type as a Waltham watch is to an hour glass. It eliminates all troubles due to loose or faulty contacts and is in a great measure the most important terminal improvement ever made.

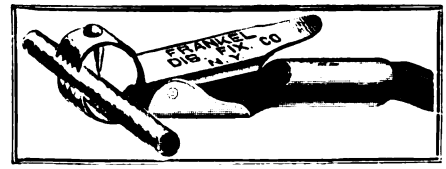


Simply press down on the spring ear and insert the wire in the eye, then let go, and the wire is making a better, surer contact than can be secured by any other means. It can't cut, because the design of the holding surfaces and the tension of the spring is just right. It can't work loose, because the clip holds it almost immovable, and it cannot corrode, because it is open to air circulation except at the point of contact. Wires cutting, working loose, and becoming corroded have always been a large source of trouble and expense. Why tolerate these troubles when the Fahnestock post eliminates them? When so ordered, all batteries will be equipped with them FREE OF COST. If you like, we'll send you a sample to show you how it is done.

FAHNESTOCK ELECTRIC CO., 132 Havemeyer St. BROOKLYN, N. Y.

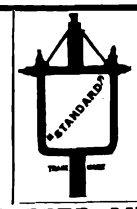
SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.
Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
Lots of 100.....11.00 per 100 Lots of 1000..... 9.00 per 100
GET out of that rut of skinning the wires—IT'S EXPENSIVE.
THIS device will save both valuable time and material—THAT'S PROFIT.
The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.
FROM YOUR SUPPLY HOUSE, OR
FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

Telephone Wire



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BARE COPPER LINE WIRE
Weatherproof and Rubber Insulated Wire and Cables
Aerial—Underground—Submarine Lead Covered Cables
TERMINALS—STEEL STRAND—HANGERS

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VOLUME XIII SATURDAY, FEBRUARY 17, 1906 NUMBER 7

Barber's Business Increased by Telephone

By Edward A. Tyler.

SEATED at a table in the dining room of the Antler Hotel in Pittsburg last March R. P. Rathbone, the leading barber of Paterson, N. J., audibly expressed his regret at not having sent an important telephone message before ordering his meal. The waiter, who overheard the remark, greatly astonished Mr. Rathbone when he told him not to worry, as he would bring him a telephone. After an absence of a moment or so the waiter appeared carrying a portable desk stand on a polished metal salver. Attached to the instrument was a connecting cord provided with a plug, and this was fitted into a jack in the adjacent wall. Thus, without any inconvenience or delay the important conversation was carried on from the table. It so happened that Mr. Rathbone was one of the most progressive tonsorial artists in the country and one who never let the matter of expense interfere with the adoption of any measures which would be serviceable to his customers. As he says himself "The idea struck me as being such a good one as to be worth adapting to my business. I have among my customers a number of the most important business men in our city. For their convenience I had a pay station installed so that they could be reached by telephone in the event of anything of importance taking place or if required for any reason at all while they were in my shop. This was much appreciated, yet it had its drawbacks, as a man might be compelled to leave the chair in the midst of shaving." Immediately upon his return to Paterson about three weeks later Mr. Rathbone got in communication with the telephone officials. At first they did not consider the plan feasible, but the barber was confident, and after some delays the system was installed.

A Patron of a Barber Shop Equipped with Telephone Connections for the Chairs May Receive Calls Transferred from His Office and Be Thoroughly in Touch with His Affairs While Being Shaved.

The shop in question is the busiest in the city, eight barbers being employed continuously. As a call is liable to be received for a man in any of the chairs, a flexible system is essential, and the plan followed in the restaurant was adopted with no change in the method of operation. On receipt of a call a uniformed boy who is kept in attendance carries a portable telephone to the patron with whom conversation is desired. The plug attached to the connecting cord is then inserted in a jack located in the base board below the shelf in front of the chairs. As there are four of these jacks, wired in multiple, one being located between each two chairs, it is easy to reach the line from any of the eight positions. From these jacks the line is carried to a controlling key, to which is wired a holding coil, at the cashier's desk. From this station two lines run to the telephone exchange, and two desk stands are provided. One is on the same wire with the jacks for chair service, the other is in multiple with the instrument in the pay station booth. These two telephones are used to receive incoming calls by a person in attendance, who sees that connection to the person desired is completed. If the chair service is in use a party can still call or be called up over the line to the booth instrument.

The controlling switch is mounted on a table behind the cigar counter. On a lower shelf is the ringer box, which also contains the induction coil for the chair circuit. From it three wires are run to the different jacks, thus greatly simplifying the wiring connections and eliminating all unnecessary parts. This is an important feature, as on account of the volume of business done it would frequently be very inconvenient to stop shaving or haircutting operations while inspectors were trying to locate a coil or condenser trouble at the jack terminations. The wiring is all run concealed, and in its installation every precaution was taken to prevent the woodwork being damaged. It may be interesting to note that the booth is furnished in mahogany to match the interior surroundings.

From a business standpoint the telephone installation has been a great success. As a general average 16 incoming calls are received daily for patrons who are in the chairs, although on some

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days the number is nearly doubled. As can be readily understood very few calls are originated over the chair circuit. Patrons who wish to talk from the shop use the booth. There have been occasions, however, when a man who has been well lathered has suddenly remembered some important business, and the opportunity to make a call under these conditions has been greatly appreciated.

An illustration of the value of this unique installation may be of interest. About two weeks ago H. M. Kirsenger, a prominent piano dealer in Paterson, came to Mr. Rathbone's to be shaved. Before he left his place of business he instructed his assistants that if any one called him he should be requested to call 709 or 710 (Mr. Rathbone's numbers) as he was going to be shaved. The barber in attendance had just applied the lather when a call was received. Without any preliminary delay Mr. Kirsenger was handed the portable desk set, and before he had replaced the receiver on the hook he had closed the sale of a piano which he had been endeavoring to dispose of for some time. Other instances of a similar nature have frequently happened, and now nearly all the business men within quite a large radius from Rathbone's place patronize him because of the convenience afforded by the telephone.

At the time the system was installed it was the only one in existence in a similar location. Mr. Rathbone has since received a large number of inquiries about it from all parts of the country, even as far as Los Angeles, Cal.; people from Chicago and St. Louis visiting New York have journeyed to Paterson to see if the newspaper reports they had read were correct. It will therefore be apparent that shops similarly equipped could largely increase their business, as public interest is genuine and the convenience of the arrangement widely appreciated. The expense attached to such an installation would be a small matter when the number of new patrons that could be secured are considered. That it is a paying proposition may be learned from almost any business man in Paterson.

The ability to obtain a belated shave in a shop in the business center of the town without getting out of touch with headquarters is a most valuable convenience to business men, and especially to physicians and others who are likely to receive a message at any moment.

Telephone Exchange Engineering

By Ray H. Manson, Albion D. T. Libby and Chas. A. Simpson.

ARTICLE XXIV.—THE MULTIPLE SWITCHBOARD SECTION.

THE telephone switchboard itself is made up of units called sections, as shown in Figs. 110 and 111. This enables one to furnish only as much apparatus as may be necessary at a given time. The number of sections will be determined by the present number of subscribers' lines and the number of these lines to be handled at each operator's position. The sections, which are usually arranged for three operator's positions, when joined together, appear as one continuous piece of cabinet framework.

The woodwork is generally made of mahogany or quarter sawed oak, mostly the former, as is the case of the sections now under consideration. The exposed woodwork of the entire section is solid mahogany, with the exception of the roof boards, which are oak and the rear doors, which are a good grade of poplar, stained mahogany.

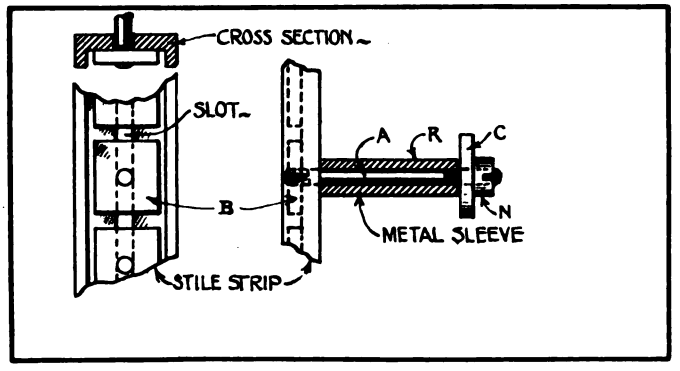

Fig. 108. Jack fastener and method of attaching it to stile strips.

The sections are designed so that easy access can be had to all parts. The entire rear of each section is exposed by the removal of three doors. Anything that is not exposed by the removal of the three rear doors may be exposed by the removal of the three panels just beneath the keyshelf in front, or by opening the keyshelves themselves.

The plugshelf runs the entire length of the section and is covered by one-eighth inch belt leather to within three-eighths of an inch of the keyshelf. This is drilled for the plugs and supervisory lamps. It is also common practice to place the latter in the hinged key shelves, so as to be more easy of access.

The keyshelf is divided into three parts in each section, the dividing line being between each two operators. They are made up in five layers glued together with the grain in the alternate layers at right angles and the grain of the top and bottom layer being parallel with the face of the section. This is done to prevent warping.

The rear and front doors are paneled to prevent warping. On the rear of the legs is fastened a maple board or "connecting rack," to which are fastened all the metal punchings, which serve to splice any "local" wire or wire within the section with any outside wire. Just below this connecting rack is located the "running box." This is a run way of oak for all cables except those attached to the multiple jacks. This running box has a removable top, made in the form of short trap doors, having flush rings for lifting them. On the floor of this running box cleats are fastened which extend about eight inches inside the legs of the section. These cleats are about three-quarters of an inch square and are used to keep the cables off the true floor, so that scrub water may not accidentally come in contact with them, and so that air may have a free circulation and thus keep them thoroughly dry. Some engineers prefer to have the strips 3 inches above the floor or higher, to protect the cables from flooding in case of fire.

Inside of the legs, just in front of the connecting rack and extending from the top of the legs to the floor, removable boards are located for protecting the punchings on the connecting rack from being hit by the cord weights. This is not absolutely necessary and in most cases is omitted.

Structural steel is used throughout for the frame of the sections. The legs at each end are made of inch and a half by one-quarter inch angle iron, which is thoroughly braced by gusset plates at the corners and by angle irons extending from one leg to the other. On the top of the legs is fastened a three-inch channel iron HS, Fig. 110, to which are fastened the keyshelf brackets BS and the jack stiles JS. This channel iron supports the weight of all the answering and multiple jacks.

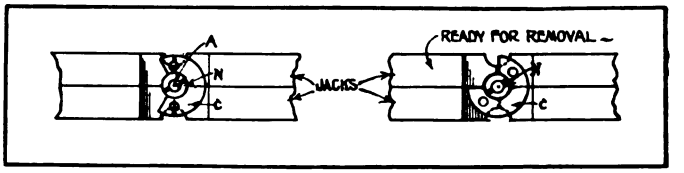

Fig. 109. Jack fastener holding ends of four strips of jacks. At the left the fastener is in position to retain all strips. To remove one strip it is rotated to the position shown at the right.

The stile strips are small channel irons which are slotted in the

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middle from the top of the 3-inch horizontal channel iron HS to the woodwork or frieze at the top of the multiple jack space. These stile strips divide the sections into six panels. They are slotted in order that the jack fasteners A, Fig. 108, may readily be adjusted to the required height. These jack fasteners are made of a piece of brass rod ⅛ inch in diameter and threaded at both ends, one end being screwed into the adjustable guide B. On the other end of this rod is a nut N and a special washer, while over the intervening portion is the sleeve R. Each jack fastener holds the ends of four strips of jacks, as shown in Figs. 108 and 109. The washer C, when once arranged, is held in place by the nut N. This washer has one-fourth of its area from the outside to the edge of the nut cut away, thereby enabling a jack strip to be removed from its place for inspection or repairs. This can be readily done by loosening the nut N and turning the washer C around on the jack fastener, as shown in Fig. 109, until that part of the washer which is cut away is opposite the desired jack, which may then be easily removed. The washer will still hold the ends of the three remaining strips of jacks.

At both ends of a switchboard section is fastened a 1½-inch by ⅜-inch bar iron upright SU, Fig. 110, which extends to the roof boards. On the top of these uprights is fastened a 1½-inch angle iron, SA, and to this angle iron the multiple jack cable hangers SC are fastened.

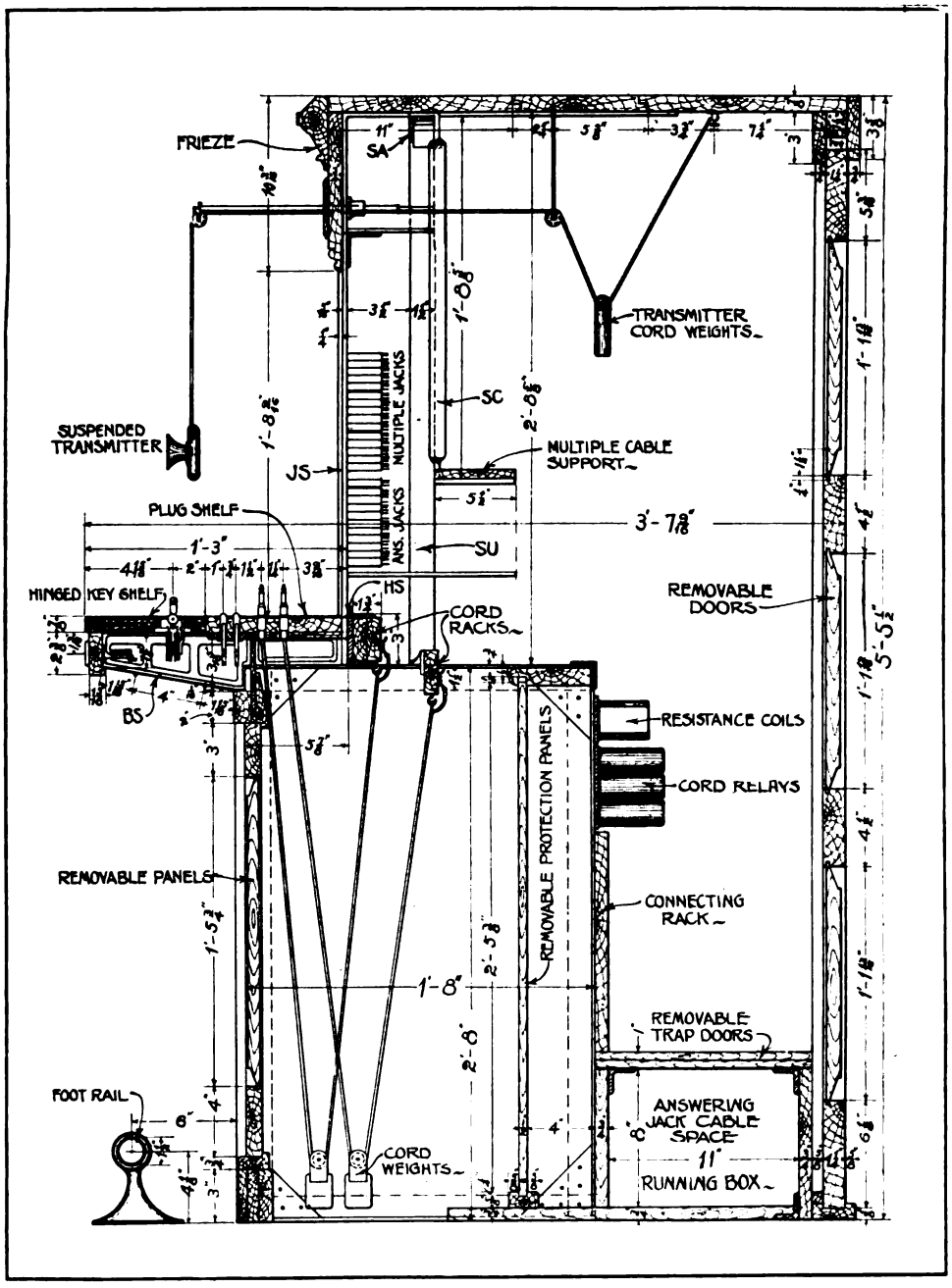

Fig. 110. Cross section assembly view of the "Example exchange" common battery multiple switchboard, showing method of attaching wooden cabinet work and apparatus to the framework.

A brass pipe foot-rest 1½ inches in diameter is supported from the floor by brackets, each section being so provided. The joint between sections occurs in the centre of one of the brackets, thus giving the foot-rest the appearance of a continuous pipe.

The cut-in jacks for the operator's receiver plug are located in the front rail of the keyshelf and on the extreme left of each operator's position. Two of these cut-in jacks are provided, one for the regular operator and the other for a student's use in learning.

The transmitter is suspended by a support or arm located in the frieze board in the center of each operator's position. The arm can be adjusted horizontally in the direction of its length. On the end of the arm are two pulleys over which the transmitter cords are run, and with the counter cord weights in the rear of the section the operator is enabled to adjust her transmitter at will to any desired height.

Breast plate transmitters (shown in Fig. 31, AMERICAN TELEPHONE JOURNAL, issue of Jan. 9, 1904), are now used to a great extent instead of the suspended type, and when properly designed give greater freedom in operating and more uniform transmission.

In cases where this type of transmitter is used, it is attached to a cord, which may be plugged into a cut-in jack in a manner similar to the receiver. This arangement permits the operator to be always close to her transmitter, even if she has to lean to one side to reach a distant multiple. It also makes it possible for each operator to have a transmatter of her own, which she always carries, even when she goes to another position on the switchboard.

In Fig. 110 it will be observed that there are two separate wooden strips for cord terminals, and that the lugs which are attached to wires for the front cord are mounted upon the board or rack nearer to the operator. In this way there is no chance for confusion of cord terminals, and the cords may be removed and replaced in the shortest possible time. In order to prevent a strain being put on the cord, which would tend to drag the conductor away from its fastening, a loop is provided near the rear end of the cord. This loop, when the cord is in position on the switchboard, is passed over a hook, as shown in the drawing. This arrangement causes the strain to be supported by the outer covering, in which a slight tension can do no damage.

In arranging for the plugs a hole is drilled all the way through the plug rail of the switchboard. Beneath this hole is mounted a metal seat, with a leather washer between the seat and the wood of the plug shelf. When the plug is idle its base

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rests upon the leather, which in turn is supported by the metal seat fastened to the lower part of the shelf.

The front view of the section shows the arrangement of the paneling on the wood work, and all the various apparatus which is visible. The lower panels are provided with catches, which release when the handles are pulled forward to a horizontal position, and the doors may be readily removed. The removal of these doors gives access to all the cords; and on the removal of the second panel, as shown in Fig. 110, the wiring of relays, resistance coils, etc., may be examined. As the cords are gradually shortened as they are repaired from time to time, it is considered desirable to install them of so great a length that if left slack they would more than reach to the floor. In order to take up the excess in length it is customary to either knot the cords in some approved fashion, or to use a small holder, not shown, which is provided with a slot at each end of a short cylindrical barrel. The upper end of the cord is passed through one slot, then four or five spiral turns are taken around the barrel, and the cord taken out through the lower slot. This arrangement holds it securely, without causing undue stress to be placed upon the cord at the point of bending. By this arrangement a long cord may be used, and frequent renewals avoided.

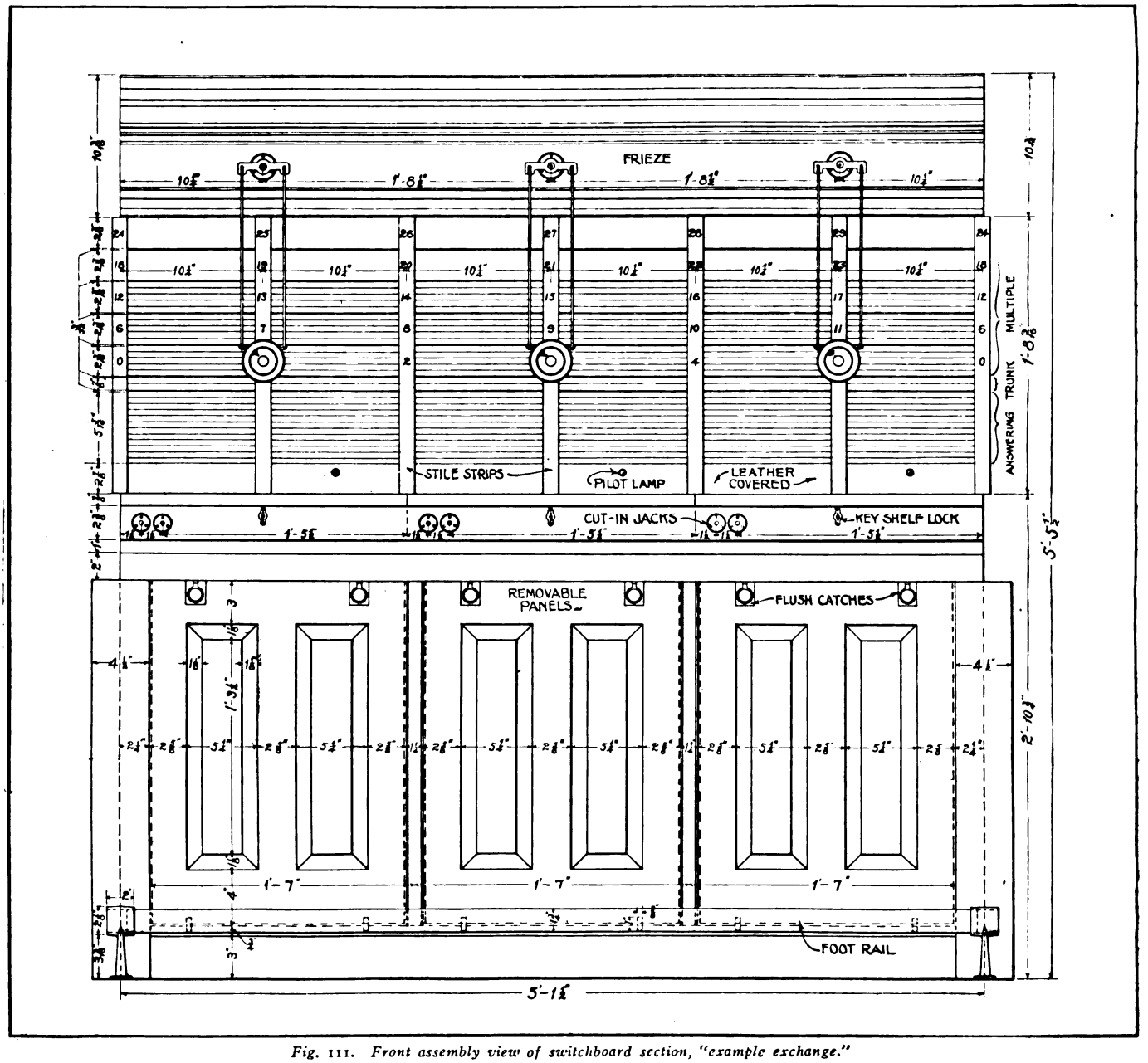

Fig. 111. Front assembly view of switchboard section, "example exchange."

Telephone Revenues

By W. P. Hemphill.

THE evolution of the telephone has been so rapid that few have been able to keep pace with it. If you should ask an experienced telephone man the most important feature of the business he would tell you that it was the subject of rates. If you should ask him what phase of the business contributed most to its success he would certainly tell you that it was the efficiency of the service.

Generally speaking, "Telephone Revenues" can be derived from only two sources, namely "Rentals," either on flat or measured service, and long distance tolls. A uniform rate to be charged by the various companies is out of the question, owing to the different conditions surrounding each station. Rates must be based on local surroundings. The reasons why service cannot be fur-

Address delivered before the annual convention of the Kansas Independent Telephone Association at Wichita, January 22, 1906.

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nished uniformly to large and small cities are many. The population of the district to be supplied with service must be considered; also the form of construction necessary, and the ultimate capacity of the plant, as well as many other questions which enter into the cost of operation of an exchange, and upon which a reasonable interest on the capital invested must be met.

The question of determining what should be considered an equitable rate, from the point of a given investment, is a proposition too indefinite to consider, but as the rates of every company represented by this association have already been determined a discussion of this phase of my subject is entirely unnecessary.

What interests us chiefly now is the question of methods of getting that which we are entitled to receive under the franchise, and ways of increasing the gross earnings without a corresponding increase in the operating account. In the first place, the selection of the subscriber is of great importance. It is upon him that you must rely for the major part of your income. His paying qualities should be well considered, the permanency of his location should be ascertained, the probable cost of getting a line to him and likewise its future maintenance. He should first be taught that the punctual payment of his account is an important obligation and that it is very much preferred that he pay it by sending a check, or by coming to the office in person. Considerable saving can be made even by a small company by insisting on the policy of subscribers paying their dues at the office. This custom allows a closer friendship to exist between the management and the subscriber and saves the expenses of collection. At Topeka we have adopted very stringent rules regarding payments and expect to continue to insist on their being observed. When subscribers become delinquent they should be notified at once, either by a statement or preferably by the bookkeeper calling them over the telephone. If they are able to give good reasons for their inability to meet their account it should be carefully noted; otherwise an urgent demand should be made for a prompt settlement. We accept the theory that a company can lose nothing from the enforcement of a very rigid policy covering the collection of accounts.

There is a growing tendency in the minds of a great many people to shirk them, on the theory that any franchise-holding company is reaping an abundance from the profits of its business. The chief duty of the telephone company is to furnish the best possible service; the subscriber's duty to the company is to pay his bills promptly and treat its employes, especially the operators, with consideration. Any telephone company makes its reputation largely as a result of the enforcement of these principles. The subscriber is a partner in your business. It is with him that you have to deal. Thus it will be seen how important a matter should be the choosing of this person.

Rentals should be paid in advance and any part unearned refunded if for sufficient reasons the patron cannot keep the service for the period paid. No installation should be accepted short of one year, for as a general rule, it cannot be handled with profit for a shorter period. The public generally has confused the idea of cheapness with the cost of telephone service. To it, an instrument connected with some wire attached to the nearest telephone pole constitutes the greatest cost of furnishing service. It has no conception of how these calls get to the central office, the method of giving connections, or the intricate and costly mechanism necessary to handle its business and the labor necessary to keep it in operation. It sees only the instrument on the wall and the wire connecting it to the pole line. It is a frequent occurrence for some prospective subscriber to say that his order was given some days ago and that you must be derelict in your business. When you attempt to explain the reason why the instrument has not been installed he generally paralyzes you with the absurd statement that: "The company has poles and wires in his alley and the only thing left to be done is the placing of the instrument." The general public little understands what a telephone exchange is, and the tremendous cost of equipping and maintaining it. This is a great reason why subscribers should understand in the beginning that punctual payment is the essence of his contract. Non-payment without a reasonable excuse should mean a prompt forfeiture of the service.

As to the revenues derived from toll-line service. The local exchange and the local toll-line company mutually link together. The exchange must have the toll-lines to provide its subscribers with long distance connections; it is equally essential for the toll-line company to have the exchange to supply its business. In the division of revenue between them, the idea of this common interest should prevail. In my mind there is no question but the equitable basis for arriving at a just division should be estimated on the amount of business originated by the exchange rather than on the basis of incoming and outgoing messages, for the reason that the greatest expense to the exchange in handling toll messages comes from the necessity of making collections and accounting. Toll-lines will never be any considerable source of profit to the average exchange company. The exchange must depend indirectly upon the prestige the toll lines afford as its source of profit.

Few Independent companies in the beginning were aware that to maintain a system it would cost more per telephone to operate, say, one thousand lines than five hundred lines, but they have since discovered when figuring operating expenses and after setting aside a safe amount to cover depreciation, that there is nothing left. Let us consider briefly, some ways of increasing revenues without a corresponding increase in the investment and operating accounts. Telephone service should be graded to suit the peculiar needs of the people. We can find relief in the use of party lines which place the rates within the easy reach of a greater number of people. The rapidly increasing use of the telephone has made a demand for its service upon every class of business. The exchange should be in a position to supply all with telephone service without working a financial burden to any.

As an illustration of how this may be done I want to cite the situation at Topeka. Our single business line rate is $36 per year, while that of the single residence line is $30. We also furnish a rate of $2.50 per month by allowing two business houses whose location is in close proximity to be put on the same line, thus paying us $60 per year for practically the same investment as the single line for which we charge $36.

In the residence district we put four subscribers in the same block on one line and charge each subscriber an annual rental of $18, thus getting a gross income of $72 per line per annum. Our party lines are made up in blocks so that the line and pole construction is no greater than that of the individual lines and from which with the additional investment of three instruments and the labor of installing them we receive an additional revenue per line of $3.50 per month, or $42 per annum. For five hundred individual residence lines we would receive an annual income of $15,000, while for the same number of four-party lines we would receive $36,000 per annum, or a difference in gross income of $21,000 in favor of the party lines. The additional investment for installation does not exceed $2,000, so that this difference in income (which is $21,000), would need to pay a reasonable interest on the $15,000 additional investment, which at best could not be over ten per cent., or $1,500. This still leaves a balance of $19,500 to the good of the party line service. But the additional 1,500 telephones which have not added a dollar to the investment in switchboard, toll line, and cable equipment, have added additional burden on the operating forces over what the number of individual lines would be.

Yet, on our basis, we still have a possible balance of $19,500 on a given number of 500 lines to liquidate all charges from the operating, maintenance and accounting departments. We feel that our party line service fills every requirement of the average residence. Many of our most influential people, who are amply able to pay for any class of service desired, prefer to remain on a party line rather than pay the additional rate of $1 per month. In this class I can include a large majority of the bankers of our city, every minister (with one exception), many of Topeka's noted lawyers, and scores of our best business men. We have, I think, demonstrated with satisfaction that party lines under the enforcement of rigid rules as to time limit for conversation and general courteous treatment among the subscribers can be made a cheap and practical means of supplying service, and the principal source of profit to the investor.

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Party lines are not the only means of increasing the revenues per line without a corresponding increase in the investment. An extension telephone at a rate of from 50 to 75 cents per month is an excellent and profitable investment to any exchange. The solicitor should be instructed to work this line of business, the value of which can readily be shown to the business man in saving time and many unnecessary steps. It allows him to answer calls promptly and many times permits him to dispense with business matters in less time than it would take him to reach the main telephone. Certainly no part of the business can show better profits than the rental of extension telephones at the customary rates. They can be made to overcome losses from unprofitable rates elsewhere.

Private branch exchanges for the large business institutions and pay stations for the use of the general public in the larger cities are also "revenue providers." I believe many of the smaller exchanges would find that public pay stations at convenient places for local and long distance service would add materially to their collections.

I want to say here a few words about "deadheads." Every exchange has this disagreeable business to a greater or less extent, and the tendency is ever to increase and never to diminish. The policy of donating service to favored classes and in lieu of special favors is a bad one and should be discouraged. There are few advantages to be gained and many disadvantages to overcome. Telephone service should be treated as any commodity. It should be purchased and paid for at its true value. There is no more reason why a telephone company should purchase its prestige through the means of "deadheading" than there is for a dry goods merchant or groceryman to give his goods away in order to court public favor. Success rests upon good service; it is the only means whereby substantial and lasting business can be built up; without it no amount of "deadheading" can perpetuate it and with it none is necessary. The subject of "deadheads" calls to mind the custom of "free service" between local exchanges. This policy injures the whole line in business and discourages investment along this line. Expediency may seem to justify this interchange of business in order to strengthen the exchange, but the sound wisdom of such a course is nevertheless questionable. The good effects resulting from these combinations are only temporary and are soon lost sight of. The connecting lines are always overtaxed with useless calls so that legitimate business must be sidetracked. This condition is unsatisfactory to the greatest interests which are the main support of all exchanges. A reasonable charge can be easily maintained between local points, and should be for the good of the service as well as the financial benefits accruing.

Football Game Followed by Telephone Reports

By A. E. McKee.

A FOOTBALL game which was played in Ohio last fall was followed by many hundred distant persons through the use of reports transmitted by telephone.

The cities of Massillon and Canton each boasted of a great football eleven. The Massillon Tigers had won hard-earned honors and the All Star team from Canton had been lifting celebrated scalps in a most interesting manner. A game for Ohio honors was finally arranged and was to be played at Canton. About $60,000 was wagered on the outcome of the game and the great match was the all-absorbing subject of conversation and speculation in both cities. Every citizen of Canton was interested in it and the same was true of Massillon.

A request was made that the telephone company arrange some plan for not only giving results, but the detailed plays as they were made. The matter was taken up by A. S. Hillhouse, general manager of the Stark County Telephone Company, who worked in conjunction with Manager M. C. Sammons at Massillon under the general direction of C. Y. McVey, general manager of the United States Telephone Company. They decided to give the people a thorough demonstration of up-to-date emergency telephone service.

A booth was rigged up on the gridiron at Canton, and connected with the long distance lines of the United States Telephone Company leading to Massillon and with the wires of the Stark County exchange at Canton. Two expert football players watched the game from a platform and with glasses called the plays to the long distance operators in the booth, who at once repeated them to the telephone operators.

At the Massillon exchange there were fifteen operators with through lines all connected with the residence and business telephones of the city.

In the Canton office there were thirty-six operators who had made connection with all subscribers who wanted the news, and they repeated the plays as they came from the field. The people of Canton who were not at the game were able to hear every play and they knew each result before the succeeding play was made and they knew the name of each player who made the star plays. There was less than thirty seconds intervening between the time a play was made and the news received by the people sitting in their homes or offices all over the city of Canton. They knew the final result before the first yell of victory had died away, and that yell was re-echoed from the homes of enthusiastic listeners all over the city.

It was the most up-to-date and modern example of special telephone service the people of either city had ever heard of, and it resulted in an immensely increased popularity for both exchanges in their respective cities.

ANNUAL REPORT OF PRESIDENT DICKSON SHOWS EXTENSIVE IMPROVEMENTS MADE BY CUYAHOGA COMPANY.

THE annual report of President F. S. Dickson to the Cuyahoga stockholders showed that during the past year there had been expended in the development of the plant the sum of $719,502.14. With that expenditure there have been added 6,070 telephones to the list in service, added six sections to the central switchboard, increased the branch exchange switchboards by 39, with an increase in revenue from $27,103 to $42,212, and the intercommunicating office system by 16. The switchboards in the Shore, Chagrin Falls, Independence and Mayfield exchanges were also enlarged. There were strung during the year 12,461 miles of copper wire, cable capacity was increased 1,350 pairs, the cable underground was increased 90,379 lineal feet, while 130,135 lineal feet of aerial cable was put in place. During the past year the exchanges at Collinwood and Chagrin Falls have been bought.

The company rewrote 3,209 of the old contracts under the new rates and is busily rewriting the others as they expire. The new contracts gave a monthly average of 505 2-3 for the year. The number of pay stations has been increased from 493 to 725, the income from that source being increased $13,627.41, which is about 60 per cent. In the part of the report relating to service it is established that the average time for the exchange to answer a call is four seconds; it takes six seconds more to complete the connection and ring, and the subscriber called consumes fourteen seconds in getting ready to answer, 88 1-2 per cent. secure an answer on the first call. In ten per cent. of the calls the line is noted as "busy," 1.3 per cent. fail to answer the bell and in two-tenths of one per cent. some line trouble interferes. As thirty-seven people every day leave their receivers off the hook, a portion

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of the "busy" trouble is accounted for. On an average 2,050 people ask daily for the time of day, 136 wish to know the weather forecasts, 3,111 ask for football returns in season and 4,790 wish to know of baseball scores, while 37,839 subscribers asked for election returns in one day last November and got what they wanted, while nearly as many subscribers called up between 5 and 6 o 'clock on a single night to ask where the fire was. There are now 75 subscribers who ask daily to be wakened at a certain hour in the morning. From the careful counts taken periodically during 1905 the total number of calls cared for by this company reached the enormous number of 51,516,324.

The company plans the expenditure of about $600,000 for development work during the present year. This expenditure Mr. Dickson estimates will increase the earning capacity of the company about 25 per cent.

The treasurer's report, showing earnings and expenses in relation to the telephones in service, was given by Mr. Dickson as follows:

Per telephone.	1903.	1904.	1905.	Dec., '05.
Gross earnings	$33.57	$31.87	$30.45	$29.99
Expenses and taxes	17.70	17.06	16.86	15.60
Net earnings	15.87	14.81	13.59	14.39
Other income	.31	.10	.09	.11
Net income	16.18	14.91	13.68	14.50
Deductions	10.39	8.77	7.74	6.87
Surplus	5.79	6.14	5.94	7.63

This is an interesting table as the introduction of the party line system must decrease the average earning power per telephone, but as it tends also to decrease the expenses and to increase the surplus, this consideration is believed to justify the introduction of the party line. It will be noticed that the surplus shown during December, 1905, is the largest on the list.

The company has been increasing the number of its subscribers so rapidly that it has gained a considerable lead over the Bell company, which has been operating for many years and has made the most strenuous efforts to retain its grip on the situation. Regarding the actual figures, we quote from the report as follows:

"It is difficult to make accurate comparisons with our rival exchange as the Bell Company does not publish actual figures. It is well, however, to note that the November book of the Cuyahoga Company had 330 more names than the October book of the Bell Company. On July 1, 1905, Mr. Frederick DeBerard, secretary of the special telephone committee of the Merchants' Association of New York City, made an investigation of conditions in this city and reported that from a careful analysis of the books there were 16,342 subscribers to the Bell Company and 16,745 to the Independent telephone. This opinion by an unprejudiced investigator confirms the anticipation expressed in our last annual report that before the year was half gone the Cuyahoga Telephone Company would lead the Bell in the number of its patrons as it does now in the quality of its service. The gratifying result has been largely due to the energy, wisdom and efficiency of Mr. W. B. Woodbury, who has had charge of the contract department."

At the annual meeting of the stockholders all the old directors were re-elected save Chas. A. Otis, who declined to longer serve. B. Mahler was elected in his place. Frederick S. Dickson was re-elected president; Henry A. Everett, vice-president; Wm. L. Carey, Jr., secretary, and R. W. Judd, treasurer. Mr. Carey was elected secretary some months ago when James B. Hoge resigned to give his time to the National-Interstate Association.

JUSTICE HOLDS COURT BY TELEPHONE IN NEW YORK STATE.

SITTING in his chambers in Kingston, N. Y., Justice Betts held court in Albany through the medium of the long distance telephone. He had been presiding at the trial of the action brought by James F. O'Gorman to recover $5,000 from Armour & Co. for injuries alleged to have been sustained through the company's negligence.

The jury retired and Justice Betts started for Kingston ofter getting the consent of Justice Fitts to receive the verdict. The jury was out all night and in the morning asked for further instruction. Justice Fitts was not familiar with the case and Justice Betts was called up at Kingston.

Over the telephone he made clear the point in the evidence which the jury wanted explained. The attorneys on both sides argued over the telephone with Justice Betts. The jury reported later that it was unable to agree, and it was discharged by Justice Fitts. The proceeding was unique in the history of the courts.

TELEPHONE RATES IN RUSSIA AND MEXICO.

SOME recent statistics relative to the rates for telephone service in Russia and Mexico have been furnished by J. Sitzenstatten, and are printed herewith, for the benefit of our readers:

RUSSIA.

Moscow:	Banks, Railways and large public establishments	$53.22	U. S.
	Ordinary business houses	40.93	"
	Residences	36.83	"
	Auxiliary instrument within same property	15.54	"
Warsaw:	First class, as above	$46.47	U. S.
	Second class, as above	35.75	"
	Third class, as above	32.17	"
	Extension instruments within same property	15.54	"

These rates are all yearly and for strictly metallic, first class central energy service.

—

MEXICO.

Mexico City and Federal District:

Mexican Telephone & Telegraph Co. (Bell):

Within the city limits:		
Metallic circuit (Wall sets)	$62.52	U. S.
Metallic circuit (Desk set)	68.52	"
Extension instrument, same building, same line	15.00	"
Single grounded lines	43.80	"

The New Telephone Co. L. M. Ericsson & Co. (Independent).

(Only metallic circuits, within the whole District).

Business telephone	$50.00	U. S.
Private residences	37.50	"
Extension telephone, within same property per year, payable quarterly in advance	17.50	"

GERMAN EMPEROR HAS CONFERRED TITLE OF NOBILITY BY TELEPHONE.

IN an article in the February *World's Work* Mr. W. G. Fitzgerald says: "One of Herr von Bülow's principal achievements as State Secretary for Foreign Affairs was the conclusion of the affair with Spain regarding the groups of the Caroline, Pelew and Marianne Islands, which gave great satisfaction to the Emperor and resulted in the promotion of the Secretary to the rank of count. The promotion took place in a typically modern way. The news of the termination of the South Sea trouble was telephoned by the Secretary to a high officer of the imperial household at the palace in Potsdam, some sixteen miles away. Five minutes later the telephone in von Bülow's study rang, and the same officer said, 'I am ordered to inform Your Excellency that His Majesty confers upon you the title and dignity of a count of the German Empire!'"

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THE EDITOR'S PAGE

AN EMERGENCY LIFE SAVER.

THE life of a prominent Philadelphia banker has been saved by the use of a properly located telephone. While lying in bed he was seized with a sudden and violent attack of ptomaine poisoning. The weakness brought on by the severe pain he endured was so great that he could not arouse the servants. A portable telephone beside his bed enabled him to call a physician, who brought him out of danger.

A case like this goes far to justify the statement that the expense for installing a telephone is even more justifiable than that for insurance. While insurance may almost afford compensation for some losses, the use of a telephone is a preventive measure. Instead of offering a money equivalent it preserves the thing itself. When a life is in danger, or even in cases where valued property is exposed to a hazard, the use of the telephone will summon assistance in the shortest possible time. Moreover, the services obtained by the telephone call are those of persons trained to meet the emergency. No time is lost through the inappropriate actions of excited or ignorant persons. The telephone enables the proper person to be selected, and he may immediately start for the point of action, prepared for the work he has to do. The telephone, then, not only enables aid to be obtained, but it reaches those capable of rendering skilful assistance, conveys the appeal quickly, and may prepare the person called to handle the difficulty in the most intelligent manner immediately on his arrival.

The obtaining of these results, however, demands something more than the presence of a telephone in the house. In the case we have mentioned as an illustration, it is possible that if the telephone had even been a wall instrument placed at the opposite side of the room the man would have died. The essential thing is accessibility. Unless the instrument can be reached with the utmost readiness its value is greatly diminished.

THE EXTENSION OF AMERICAN TELEPHONE PRACTICE.

A NOTEWORTHY event in the development of telephony is the installation of the new switchboard at London, in connection with the system of the British Post Office. This equipment is illustrated and described at some length in a recent issue of the *Electrical Review*, of London. As it is manufactured by an American company, and installed in accordance with American standards, the supremacy of the apparatus and methods of doing work which have been developed in this country seem to have received the strongest kind of indorsement.

In view of the well known spirit of conservatism which has hitherto hampered the British engineers in their development of the system, it is extremely interesting to note the modifications in the arrangements for handling traffic which have been introduced. The entire equipment is arranged in a manner which is conformant with the accepted methods in vogue on this side of the water. As not more than 20 per cent. of the calls coming to a given switchboard can be completed in the same office district, the subscribers' multiple in subscribers' sections has been omitted, all calls being completed through a trunk switchboard. This method of handling connections is another instance in which the Post Office engineers have adopted without change a system developed in our largest cities, where similar conditions prevail.

A most significant line of thought is opened up by this unqualified adoption of a foreign system. This was brought about only after a long and careful investigation by the persons in charge of the work had convinced them of the extremely high state of perfection to which telephone development has been carried in this country under the stimulus of a vigorous competition. For this reason it is a safe prediction that the present installation, which will be watched with the greatest interest by the foreign engineers, will only be the forerunner of many others which will follow the practical demonstration of merit in the present case.

During the visit of the foreign engineers to this country, at the time of the St. Louis exposition, the greatest interest was taken in the equipment and operating methods of our telephone companies. Since that time it is fair to presume that the information gained at that time has been supplemented by many additional facts, gained from sources opened for their investigation during the visit. The field of American telephone practice has been looked over with considerable care, not only by engineers in England, but also by telephone men in Germany, Austria, Sweden, Italy and France. In all of these cases there are indications that the methods learned have been considered worthy of adoption. Their duplication, however, would entail an enormous amount of work on the part of the foreign service. In many instances Government control operates to hamper initiative and lower the rate of progress to such an extent that the building up of complete plants for the manufacture of apparatus would be a very slow process. Moreover, where a complete change in methods is put in force it takes considerable time for those handling the work to form plans for progress in the art. This would tend to allow the lead gained in this country to still be maintained if a policy of imitation were to be determined upon. The field seems to be particularly open at the present time, and it is to be hoped that the result will be a widespread introduction into Europe of the methods which are now conceded to be superior.

AN ADVERTISING HINT.

THE Niagara Falls Light and Power Company is said to have recently put into practice a scheme for getting advertising copy which may convey a useful hint to telephone companies. The plan is used in connection with advertisements in local papers which are frequently changed. By the use of these advertisements the copy is always fresh and interesting, and, in the course of a year, reasons for the use of the company's service may be given which will reach in a striking manner almost every reader of the papers. The method of obtaining the copy for these advertisements is, however, the most unique feature. The company places the matter in the hands of its solicitors and uses the best idea which comes in each day. The result of this plan is that the advertisements may be made to cover the local situation very thoroughly and be worded in a manner that will appeal forcibly to individuals. It is generally recognized that the man outside has exceptional facilities for gauging the state of public opinion. The details of objections to the use of the commodity which he has to sell and the reason why he fails to interest people are familiar. The solicitor is likely to require some coaching in the best manner of stating reasons, but should be familiar with the arguments that bring results. The officials of the company in this case are endeavoring to put this knowledge to the fullest use. The plan is unique and interesting and seems to be well adapted for use by telephone companies. It is so likely to produce good results that it seems to be well worth a trial.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HOUSE MOVING AND TELEPHONE WIRES IN TEXAS.

Can you give us any cases bearing on the rights of house moving along the streets in conflict with telephone wires in the State of Texas? Any information you can give will be appreciated. A. D. Co.

THE law as regards house moving in conflict with telephone wires in the State of Texas is substantially the same as it is in other States. It is generally held to be an unreasonable use of the street, and telephone companies have the right to be protected from interference. When the house mover has permission from the city to move a building, and there is no other way for it to be done except across the street occupied by the company's lines, telephone companies are obliged to move their wires and cables to let the building pass. If the person moving the building can use a side street or an alley just as well, he can be compelled to do so. The person moving the building can be required to pay all the expenses of moving and replacing wires and cables, and can be compelled to guarantee payment beforehand. A bond to pay all expenses and hold the company harmless may be required. If the house mover refuses to protect the company in this way, he may be enjoined from interfering with the company's rights. The theory upon which these rules rest is that the franchise of the company is a vested right in the streets that cannot be impaired by subsequent action of the city directly or indirectly annulling it for purposes not public. The use of a street for moving houses is an extraordinary use thereof, and while it may be permitted, it must not be permitted in such a way as to destroy the use of the streets for other public purposes. The law is well stated in N. W. Telep. Exch. Co. v. Anderson, 98 N. W. 706.

CONSEQUENCE OF ERROR IN DIRECTORY.

By mistake the name of one of our patrons was published in the directory as being engaged in the saloon business. He was, in fact, the proprietor of a meat market. He claims that the mistake has resulted in large damages and threatens to sue the company unless we make some kind of a settlement with him. What do you advise us to do? R. L.

THE saloon business is a perfectly lawful one and it would be necessary for your patron to prove that he had actually been damaged before he could recover anything from your company. In other words, he would have to show that customers of his were actually led to cease trading with him on account of the error, or that persons who contemplated trading with him were driven away. If he could not show either of these facts he would not be entitled to claim anything from the company. We would suggest that you investigate as well as you can the question of whether he can prove any such damages or not, and be governed by the result of the investigation.

INJURY FROM FALLING TELEPHONE POLE.

A CHILD eight years old, who was hurt by a falling pole of the Southern Bell Telephone and Telegraph Company, brought suit in Georgia by her next friend against the company for damages. It was alleged that her injury was sustained by reason of the negligence of the company's servants who were engaged in cutting down the pole which was upon the public highway, without the use of guy wires, ropes or props, and without having any person stationed near the pole to warn the public of impending danger. The company answered, admitting that it did not use guy wires, ropes or props, but averring that one of its servants was stationed near the pole to warn the public, and actually warned the plaintiff, but that she disregarded the warning. The little girl testified that she did not stop when warned, but thought she could get by before the pole fell. The jury brought in a verdict for the company and the plaintiff appealed. The question before the Supreme Court was whether the judge properly instructed the jury as to what would amount to due care on the part of a child eight years old. His instructions upon this point were approved and judgment confirmed. Stewart v. Southern Bell Telephone & Telegraph Co. (Ga.), 52 S. E. 331.

POSTAL CARD BILLS ARE DUNS UNDER POSTAL LAWS.

THE Indianapolis Telephone Company met an obstacle in the shape of the Federal postal law that interfered with its new plan of collecting accounts. Postal cards were sent quarterly in advance. The postal is supposed to be returned with check or cash, and it is so arranged that it can be cut in two and stamped "paid," one-half returned to the patron, the other half kept by the company. The plan was not well received and soon after the first bills were thus sent out the attention of the Federal authorities was called to the fact that the company was sending duns by postal card in apparent violation of the law.

WARRANT READ OVER TELEPHONE LINE.

AT Middlesboro, Ky., an arrest was made in which the telephone played an important part. A warrant was sent to the sheriff at Pineville for the arrest of one John Partin. The sheriff called Lieut. Wilburn of the Middlesboro military company by long distance telephone and told him to call Partin. When the latter answered the sheriff read a warrant for him charging him with the murder of a man at Corbin some time ago. Wilburn took Partin in charge and conveyed him to Williamsburg, where he was placed in jail.

PLACE OF CONTRACT MADE OVER TELEPHONE.

THE Sperry Flour Company, a California corporation, was sued in the Superior Court of Yolo County for money alleged to have been advanced it by the bank of Yolo. The company asked a change of the place of trial to San Francisco, where its principal place of business was located, on the ground that it had not been sued in the proper county. The question of where suit should have been brought depended upon where the contract, in accordance with which the money sued for was loaned, was to be performed. The cashier of the bank in Yolo County called up the agent of the defendant at Sacramento by telephone, and in effect offered to advance a sum of money to the purchaser of a lot of wheat if the defendant would agree to honor his draft for $1,400. The agent of the defendant answered by telephone that they would honor the draft. Relying upon this promise the bank advanced the money to the purchaser of the wheat and drew upon the defendant for the $1,400, which draft was duly honored. The court held that the contract was made in Sacramento County. This would have entitled the plaintiff to sue in Sacramento County had it not been that the contract was intended to be performed in Yolo County. It was, therefore, finally decided that the suit was brought in the proper county. Bank of Yolo v. Sperry Flour Co., 141 Cal. 314, 65 L. R. A. 90.

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IN THE OPERATING FIELD

SOUTH DAKOTA COMPANY TO RAISE MONEY FOR EXTENSIONS.

AT the annual meeting of the Grant County Telephone Company the stockholders took up the consideration of a proposition to issue bonds to the amount of $30,000 for the purpose of extending the company's lines.

Since the organization of the company eight months ago 400 miles of lines have been built and over 400 telephones are in operation, with 150 more ordered to be installed at once. The company has in view the extension of the line from Corona, its present northern terminal, to Wilmot, Sisseton and Brown Valley. A line will be run immediately from Big Stone to Ortonville, where connections will be made with the Tri-State Telephone Company. The company is in Southshore, Coddington County, now and will probably extend to Watertown before long. Over $20,000 has been expended up to date. The money was secured by the sale of stock in $40 shares. It is all in the hands of farmers and local merchants, who are well satisfied with the rapid progress made by this enterprise.

AN ATTEMPT TO RELIEVE THE INDEPENDENT SITUATION IN OHIO.

AT a recent meeting of the city council of Toledo, O., a resolution was adopted, which requests the Lucas County representatives to the State Assembly to have passed a bill to authorize city councils to regulate telephone rates every seven years. The city solicitor has prepared such a bill and has sent it to Columbus for consideration at the hands of the State Legislature. The proposed law contains the following provisions: That the council of any city or village may be empowered to regulate, from time to time, the prices or rates which telephone companies may charge for service; that such prices or rates, so fixed, shall include rentals of telephones, instruments or other appliances; that companies incorporated to give telephone service shall be compelled to furnish such cities, solely for the use of such municipalities, in connection with a fire alarm exchange system, all other accessories necessary to complete public service, and the free use of not to exceed 25 telephones, and to keep such telephones in working order; that the company may, after six months from the adoption of the ordinance, file its written acceptance of the terms of the ordinance with the clerk of the council, and, if it does not do so, the council may change them as often as it desires; however, if the company accepts the terms, as laid down by the council, the terms are good for seven years, when the city body may again adjust the rates. The city solicitor is directed by the provisions of the bill to enforce the ordinance.

The proposed bill will affect all telephone companies throughout the State alike, and strong efforts will be put forth to secure its passage. If passed it will interfere with the vested rights of those companies holding the franchises and operating under them in the State.

NEW STATE TELEPHONE COMPANY OF IOWA TO ISSUE NEW CAPITAL TO PROVIDE FOR EXPANSION.

AN issue of $100,000 of stock was decided upon at a recent meeting of the board of directors of the New State Telephone Company held in Sioux City. This sum will be employed to extend the lines of the company. From northwestern Iowa, its original territory, it is now building extensions in Minnesota and Dakota, which, with the new lines, will give it a very efficient toll system.

Work on the improvements will begin at once. It is said they will include a trunk line to Council Bluffs and South Omaha, through lines to Sioux Falls, Yankton and Elk Point, a line to Worthington, Minnesota, to connect with the Tri-State company's line from Minneapolis, and an extension from Randolph to Lincoln, Nebraska. The latter extension will not be completed until next summer. The lines to Elk Point, Yankton, and Sioux Falls are practically completed now, and will be turned over to the operating department next week. The line to Council Bluffs is completed as far as Blencoe, Ia. The Worthington extension will be made north from LeMars.

These extensions will add about 500 miles to the company's system, which has at present about 1,000 miles of lines in service. The connection with the Tri-State company at Worthington will put the exchanges of the New State company, including that at Sioux City, into communication with 12,000 miles of copper wire toll lines in Minnesota and North Dakota, extending as far west as Grand Forks, North Dakota, and north to Duluth, Minnesota. The Council Bluffs line will connect with independent toll lines as far south as Kansas City and St. Joseph, having a mileage of many thousands.

The following directors were elected for the coming year: Charles G. Cockerill, Jefferson, Iowa; M. M. Head, Jefferson, Iowa; Ira Conger, Cherokee, Iowa; Joseph Mattes, Odebolt, Iowa; W. H. Leathers, Mapleton, Iowa; Fred Marquis, Onawa, Iowa; C. H. Smith, Sioux City, Iowa.

The following officers were elected: Charles G. Cockerill, president; W. H. Leathers, vice-president; Joseph Mattes, second vice-president; M. M. Head, treasurer; C. H. Smith, secretary.

THE CONSOLIDATED COMPANIES OF PENNSYLVANIA TO INSTALL SEVERAL LARGE EXCHANGES.

AT the annual meeting at Allentown the Consolidated Telephone Companies of Pennsylvania elected these directors: Robt. E. Wright, Wilson J. Hartzell, Geo. O. Albright, Thos. Daugherty, Allentown; Isaac Heister, A. J. Brumbach, Reading; Frank M. Green, Washington, D. C.; J. P. Helfenstein, Shamokin; George R. Bedford, W. H. Lathrop, George N. Reichard, I. A. Stearns, Wilkesbarre; C. W. Kline, Alvan Markle, Hazleton; C. D. Simpson, Scranton; A. P. Trautwein, Carbondale. The directors elected these officers: President, Robert E. Wright; vice-president, C. W. Kline; secretary and treasurer, C. M. W. Keck; general superintendent, Charles West. The company owns the Independent systems at Scranton, Carbondale, Wilkes-Barre, Hazleton, Slatington, Lehighton, Mauch Chunk, Allentown, Reading, and many other smaller towns in Eastern Pennsylvania. No dividend was declared, in view of the fact that the board has contracted for new exchanges at Allentown, Hazleton and Emaus, at an expense of $160,000.

MARYLAND TELEPHONE AND TELEGRAPH COMPANY ELECTS NEW OFFICERS.

AT a recent meeting of the directors of the Maryland Telephone Company Mr. H. W. Webb resigned as president and Mr. David E. Evans, vice-president, was elected to fill the vacancy. Mr. Benage S. Josselyn was chosen vice-president to succeed Mr. Evans. In addition to resigning the presidency, Mr. Webb resigned from the board of directors, and Mr. Josselyn was elected in his place. Mr. Webb also resigned as vice-president and director of the Baltimore Electric Power Company, and Mr. Josselyn succeeded him.

Mr. Josselyn, the new vice-president of the company, is a Philadelphian, and represents the Philadelphia interests in the

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company. He has been in the president's office about three months.

After making the changes in the officers the directors elected the following executive committee: Messrs. Sidney L. Wright of Philadelphia, George R. Webb, John Waters, David E. Evans and Bernard N. Baker.

INDIANA INDEPENDENTS DENY MERGER WITH BELL.

MANAGER W. L. MOELLERING, of the Home Telephone and National Telegraph Company, has denied in most emphatic terms a story sent out from New York to the effect that the Bell Telephone Company had made overtures to purchase the properties of the local Independent company, and he stated positively that no such deal would be made or even considered. The story sent out was as follows:

"New York.—It is reported in electric and telephone circles in Wall Street that the American Telephone and Telegraph company, the corporate name of the old American Bell, is to quietly acquire through local capitalists all the desirable local systems in Ohio, Indiana, Illinois and Michigan and has secured the National Telephone system and Home Telephone Company, of Fort Wayne, also the local systems of South Bend, Cambridge City, Hagerstown, Kendallville, Auburn, New Haven and others. The story is neither affirmed nor denied at the office of the company here. President F. P. Fish is now in the West looking over properties. The company has just issued one hundred and fifty millions of bonds to buy the new lines."

Theodore Thorward, manager of the system at South Bend, has stated that George W. Beers, who is president of the Indiana Association of Independent telephone companiees, told him that the story sent out from New York was a series of fabrications, pure and simple, and that statements made in the New York dispatch could not possibly be true, as one of the conditions of the transfer of plants and exchanges to the Independent telephone corporation is that the plants must not pass into the hands of the Bell company.

W. B. Woodbury, who has been assistant general manager of the Cuyahoga Telephone Company, has resigned this position, and will represent the syndicate which intends to build up an Independent telephone system at Detroit, Mich., during the construction of its plant.

PROGRESS BEING MADE IN ARIZONA.

INDEPENDENT telephone service is being rapidly developed in Arizona. The Sonora Telephone Company is extending its lines from Hermosillo, Arizona, in several directions, connecting the capital with several widely separated localities. A line is in operation between Hermosillo and La Colorado (Minas Prietas), and this is now being extended to Suaqui de Batuc. It is at present in operation as far as Matape, a point about fifty miles eastward from Minas Prietas, and eighty-five miles from Hermosillo. Another line is being built up the Sonora River, connecting Hermosillo with the towns of San Miguel de Horcasitas, Los Angeles, and Rayon. It will reach Opodepe within a short time. From the latter place it will be extended to Tuape, Cucuripe, and other points northward, eventually reaching both Nogales and Cananea.

GOOD FINANCIAL SHOWING OF DULUTH COMPANY.

STATING that $26,779.38 was expended in improvements last year, and giving the cost of the plant at $379,597.37, the Zenith Telephone Company, of Duluth, Minn., has filed with the city comptroller, as required by the charter, its annual sworn financial statement.

With an expense of $43,908.43, and revenues of $62,437.37 from telephone rentals, and $1,646.13 from toll lines, the company reports the balance of receipts over expenditures at $20,175.07.

In its list of actual liabilities, debts, encumbrances and obligations, the company gives the following:

1862 shares of stock at $100	$186,200
Bonds	100,000
Preferred stock	104,300
Accounts	8,399
Total	$398,899

It is stated that in the matter of construction last year, the company expended $12,068.20 in salaries and wages, $13,887.98 for overhead, and $823.20 for underground material.

WEBSTER CITY IN THE CENTRE OF DEVELOPMENT IN HAMILTON COUNTY.

HAMILTON COUNTY, Ia., is at present the scene of great activity in Independent construction. The Martin Telephone Company of Webster City is building several new toll lines, and is making preparations to install new exchanges at Stanhope and Stratford. Two new lines are under construction to Waterloo, and others are being built into Blairsburg, Williams, Kamrar and Jewell.

By traffic arrangements with the Woolstock Company, the Martin Company will inaugurate a ten cent rate to that point.

INCREASED TOLL FACILITIES FOR SOMERSET COUNTY SUBSCRIBERS.

ARRANGEMENTS were recently made by the Somerset County (Pa.) Telephone Company, whereby its patrons could reach points in the territories of twelve other systems. Amongst the new toll points are Berlin, Boswell, Stoyestown, Lincoln, Hooversville, and Rockwood. The Somerset County Telephone Company was the pioneer in this part of the State. It has always been progressive, and, as a result, its lines virtually cover the county. The officers of the company are A. F. John, of Johnstown, president; F. W. Beisecker, vice-president; H. M. Berkley, treasurer; Josiah Swank, secretary. The directors include the officers and E. D. Schade of Johnstown, E. M. Beachley and Harry Straub of Meyersdale.

HOME COMPANY OF MOBILE REACHING OUT AND IMPROVING CONSTRUCTION.

COAST resorts in Alabama will shortly have Independent connection with Mobile. The Home company has recently finished laying submarine cables across the Mobile, Spanish and Texas rivers, which formerly prevented the extension of the lines of the Mobile company to those points. The entire system in Baldwin County, which was recently secured by the Home company, is to be rebuilt, and many other extensions and improvements will be made.

NEW INDEPENDENT COMPANY IN CYGNET, OHIO, GIVING EXTENSIVE SERVICE.

THE Oil Belt Telephone Company, of Cygnet, O., connects with all Independent telephone companies for long distance service and gives its subscribers free service to Bowling Green, Sugar Ridge, Scotch Ridge, Cloverdale, New Rochester, Portage, Rudolph, Dukay, Bays, Mermill, Mungen, Trombley, Cygnet, North Baltimore, Bairdstown, Van Buren and Galatea, and will extend its lines as rapidly as possible to other surrounding towns. There are now sixty-one telephones connected to the Cygnet switchboard and new business is coming in rapidly.

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QUERIES

COIL CONNECTIONS.—(659.)

Will you please explain how the windings are placed on a coil to make them work against each other, also to work in unison? V. L.

In the accompanying illustrations, Figs. 659a and 659b, are shown the arrangement of connections to produce the results you mention. In Fig. 659a the coil is provided with two windings A C and D E. These two windings are connected to work together, that is, in such a manner that the lines of magnetic force will form a continuous circuit throughout the core. This method of connecting produces what is called an inductive winding, and when this is the result of joining two or more coils in series, as in this case, the coils are commonly said to "work together." The fact that the magnetic circuit is closed, and that the magnetic lines of force are continuous throughout the entire core, may be deduced from an application of a familiar rule to determine the direction of the magnetic lines when the direction of the current flow is given. The rule is that, when one is looking at the end of an electromagnet, the pole which is nearer to him is the south pole if the current is passing around the magnet in the same direction as the rotation of the hands of a clock; if passing in a reverse direction, the north pole is nearer to the observer. In applying this rule to Fig. 659a, if the observer stands at the right it will be seen that winding A C will produce a north pole, G, at the nearer end, and the winding D E a south pole, H. Looking at the coils from the left, the winding D E produces a north pole, F, at the nearer end, and the winding A C produces a corresponding south pole, I. In this manner it will be seen that the north pole is always adjacent to the south pole in every part of the core, and the lines of force are, therefore, continuous. It is advisable to state that it makes no difference in the application of the above rule whether the wire is wound on a right hand or left hand spiral; it is the direction of the current, considering it as passing from the positive pole of the battery to the negative pole which counts.

In Fig. 659b is shown the arangement of the same coil, connected up in such a manner that the magnetic lines are not

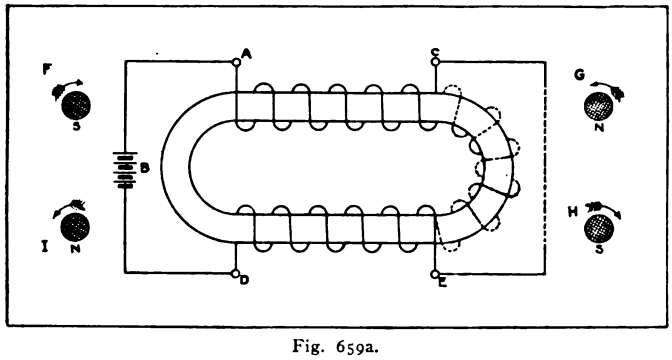

Fig. 659a.

continuous, at which time the two windings are said to work against each other. In this case the connections of the coil A C are such that the direction of rotation of the electric current is opposite to what it was in the previous case. By an application of the clock rule it will be seen that in the middle of the core a south magnetic pole is next to another south pole; and on the other side a north pole is next to a north pole, the polarity of sections II, I being opposite to that in the previous cases. As it is well known that like magnetic poles repel each other, the origin of the statement that the coils work against each other is evident. It will be observed that the method of securing this result is to reverse the connections of one winding. If both were reversed the magnetic polarity throughout the whole core would be reversed, but, at the same time, the magnetic force would be continuous in direction.

Another simple method of determining whether both windings are working together is illustrated in Fig. 659a. If the two coils are connected in such a way as to have the effect of a single spiral

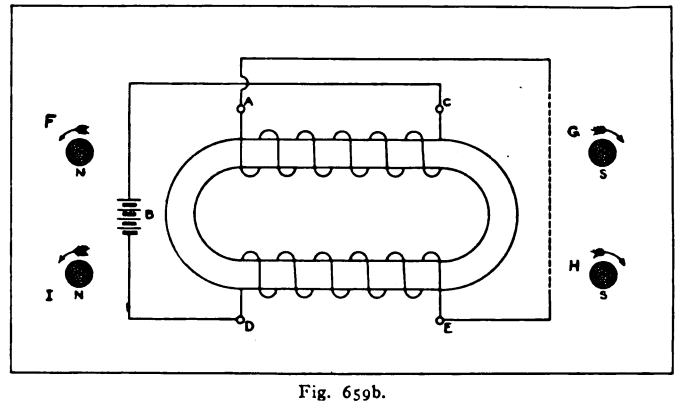

Fig. 659b.

winding carried continuously around the core in the same direction, as would be the case if the connection C E, instead of being through the line, etc., were carried continuously around to the iron, as indicated by the dotted spiral lines.

The diagrams show a battery as the source of current. The principle is the same if the current is due to ringing or other alternating current, which is only a succession of direct current impulses passing in first one direction and then in the other.

DISTURBANCE ON TELEPHONE LINES FROM WIRELESS TELEGRAPH FIELD.—(660.)

Is there any method for preventing the receipt on telephone lines of message from a wireless telegraph station located near the lines? Are such currents heavy enough to ground the carbons of an arrester? F. J. C.

When a telephone line is located near a wireless telegraph station, the electrostatic field of the wireless may be so intense that a constant stream of sparks will pass across the carbon plate lightning arrestors at the telephone station while the key is sending an impulse at the wireless station. This difficulty may be readily overcome by connecting two condensers of equal capacity across each of the two carbon plate arrestors. These condensers should have a capacity somewhere between .1 and .5 microfarads, so that they will not appreciably affect the transmission on the line.

The wireless electrostatic field above mentioned is of an alternating nature and has a period of between 500,000 and 1,000,000 cycles per second, so that these condensers act as an almost perfect short circuit to ground for alternating currents of this nature, while for telephone currents having about 800 cycles per second, they offer sufficiently high resistance to not put any material shunt on the line.

If the telephone line is in the wireless station itself, the currents passing between the carbons will be sufficient to ground them occasionally.

In the case of stations located near the wireless station, the currents will probably not be sufficient to ground the carbons, if well brushed.

In conclusion it should be noted that an ordinary telephone transmitter in operation is a more or less sensitive receiver of wireless telegraph emanations, and under certain local conditions will cause the reproduction of wireless messages on telephone lines where the transmitter is located near the wireless station.

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—Second-hand telephones. State make of magneto, transmitter, receiver, style of backboard, time telephones have been in service. Address LaFayette Telephone Co., LaFayette, Indiana. 536

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Experienced telephone men of good appearance and address as traveling inspectors for the Engineering Department. We need men to fill vacancies caused by recent promotions. Address George J. Yundt, Engineer, Southern Bell Telephone & Telegraph Company, Atlanta, Ga. 530

WANTED—Continued

A SQUARE deal is what we aim to render both employer and employee, when seeking the right man for a place, or the right place for a man. Without effort on your part, without endangering your present position, and without using your employers' time, we hunt up the position for which you are best qualified. Let us find the positon for you. Hapgood's, Suite 511, 309 Broadway, New York City. 464

WANTED—Permanent position in the West or Middle West by competent cable splicer. Address Box 545, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 545

WANTED—Young men not over 22 years of age, preferably high school graduates, to enter apprenticeship course of a large telephone factory where they will be trained to install and operate large modern switchboards. Address, stating age, education and electrical experience, Box 546, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 546

WANTED—Position as manager, superintendent or wire chief. Eleven years' experience; good, all-around telephonist. Can take complete charge of from 1,000 to 2,000 subscribers. Address G. W. J., manager Home Telephone Company, Uhrichsville, Ohio. 547

WANTED—Telephone salesman. A large telephone supply house located in the Southwest wants a first-class traveling man. As briefly as possible, give experience, references and description. Address Box 542, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 542

WANTED—An active partner with some money to put in a good paying telephone business. Owner is forced to take this action because of lack of capital to carry on rapidly expanding business. Address Box 543, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 543

HELP WANTED—Large telephone company desires a full equipment of good men and women, must be experienced; give full description in application. 549

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GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

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TELEPHONE PATENTS

SELECTIVE SYSTEM.

William Palmer, Jr., Rincon, New Mexico, patents (No. 810,878, dated Jan. 23, 1906; filed July 18, 1902; serial No. 116,075) a selective call for telephone and telegraph systems.

This patent relates to that class of selective systems which rely upon a step by step movement to bring the desired station into circuit. Its novel feature is a circuit arrangement whereby two parties on the same wire can talk together without interference. Owing to the complicated arrangement of the parts of mechanical devices designed to accomplish the inventor's purpose, which require six sheets of drawings for elucidation, we are unable to fully describe this patent in the space at our disposal, and would, therefore, suggest that all parties interested secure a copy.

TELEPHONE HOLDER.

Louis S. Hallowell, New York, N. Y., patents (No. 808,983; dated January 2, 1906; filed March 28, 1905; serial No. 252,537) and assigns one-half to Thomas L. Ricart, Philadelphia, Pa., a telephone holder. The object of this invention is to provide a holder which will be adapted to retain a telephone stand at-

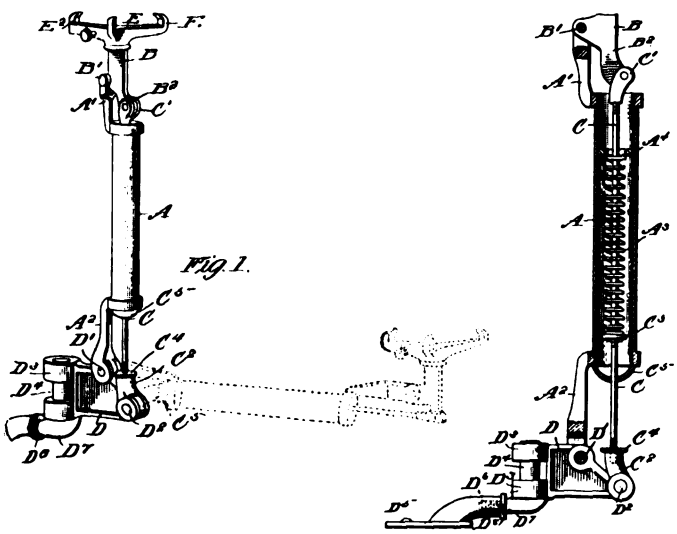

Fig. 1.

tached in any position within the arc of travel of a counterbalanced arm. For this purpose a hinged base *D* is provided, to which is attached a tube *A* and rod *C*. A clamping device *B*, to receive the telephone, is attached to the tube *A* by a pivot *H*, and to rod *C* by pivot C^1. Within the tube *A* is a flange A^4, having an opening in its center for the rod *C*. This flange acts as a stop for spiral spring A^3, surrounding the rod *C*, the other end of which is retained in position by an adjustable seat C^3 attached to the rod. Owing to the design of the arm and the relation of the pivotal points to the movable members the holder *E* will be maintained in a horizontal position undisturbed by the movement of the supporting arm. The spring A^3 acts as a counterbalance to offset the weight of the telephone and support and retains the arm in any position from the vertical to the horizontal.

WIRE CONNECTOR.

Nathaniel W. Lillie, Somerville, Mass., and Anton Freier, Boston, Mass., patent (No. 806,477, dated Dec. 5, 1905; filed Feb. 20, 1905; serial No. 246,428) and assign to the Holtzer Cabot Electric Company, Brookline, Mass., a wire connector.

This invention discloses improvements over the ordinary wire connector as follows: The central portion is made softer than the ends by tempering so that in the process of twisting a good electrical connection can be secured between the surface of the wire and the conductor; also it can be so made that when it is required to connect a branch conductor to a main line the main

Fig. 5.

Fig. 6.

line wire can be laid in a groove and the connection made without it being necessary to cut the main line wire.

These features are indicated in Figs. 5 and 6, the edge a^3 being formed into a recess into which a wire may be introduced. The closed loop portion serves to hold the branch wire and the joint is completed by twisting in the usual manner.

ANCHOR.

George F. Swortfiger, Newark, N. J., patents (No. 809,032, dated Jan. 2, 1906; filed August 1, 1905; serial No. 272,210) an earth anchor.

This device consists of a shaft having a threaded lower extremity, to which are attached two wings which normally fold upwards in a vertical position. After a hole has been made the anchor is inserted and the shaft revolved. This causes the supporting frame to be withdrawn along the threaded portion toward the surface of the ground, thereby forcing the wings to spread outward and engage the surrounding earth. By revolving the shaft the wings may be made to assume a position at right angles to it and thus offer a great resistance to its withdrawal. Revolving the shaft in the opposite direction causes the wings to fold up and in this way the anchor may be withdrawn.

GROUND ANCHOR.

Ezra C. Holden and Harry Holden, Des Moines, Iowa, patent (No. 809,374, dated Jan. 9, 1906; filed Dec. 9, 1904; serial No. 236,101) a ground anchor.

This device consists of a curved longitudinal plate having its ends rounded off into the form of scoops. Adjacent to each end is a strap which encircles the exterior and is provided with eyes to which rods or wires are attached. In operation a hole is first dug with an earth auger. The curved plate is then allowed to slide into the hole to the required depth in a vertical position. The wires or rods attached to the strap fastened to the lower end of the curved plate are then pulled, which operation causes the scoop-shaped ends to dig into the earth, and if the strain is continued long enough the plate will lie at right angles to the hole, with both ends firmly imbedded in the adjacent earth. The entrance hole is then filled up and the anchor is set. To withdraw, the wires or rods attached to one end of anchor plate are pulled till the latter is drawn into a vertical position, when its further removal may be readily accomplished by a continued strain.

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LEADER, JR., TELEPHONES

APPEAL TO THE SENSES

Sight, Hearing, Touch, we might almost say they Taste good. Let us prove it to you now at our expense. Two 'phones — 30-day trial free — special price.

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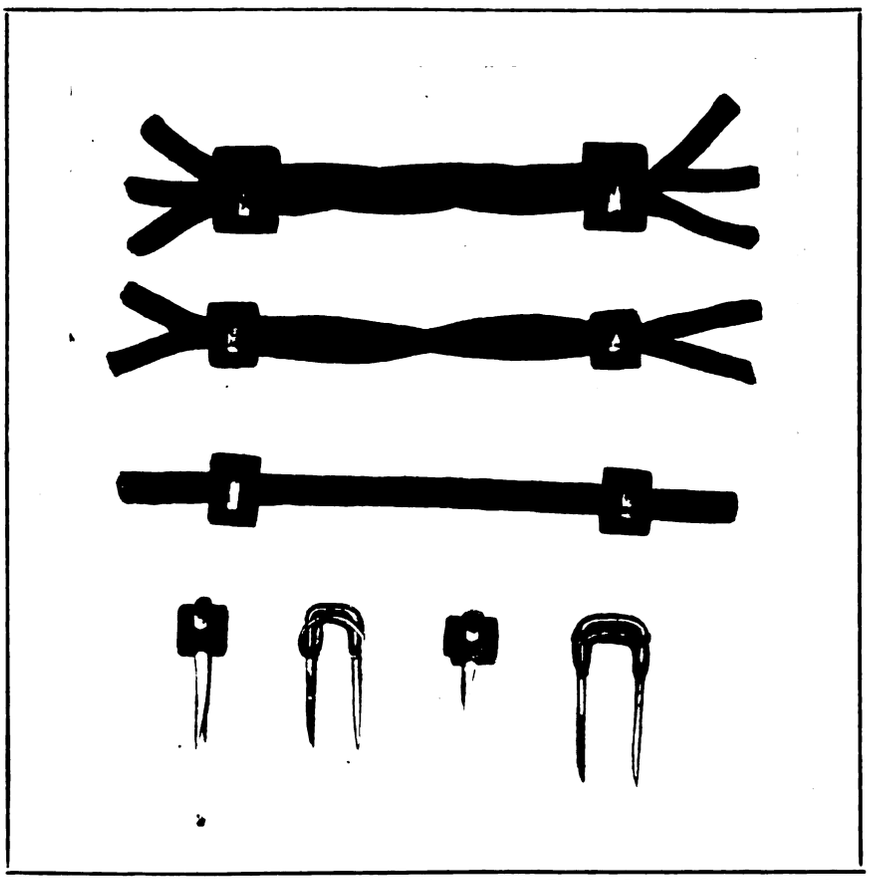
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A NEAT AND ECONOMICAL WIRE FASTENER.

THE advantages of the use of staples for fastening wires upon woodwork in exposed locations are generally recognized. A careful workman can by their use run a wire in a manner which makes it much more inconspicuous than when cleats are employed, and this method of fastening very frequently does away with the necessity for concealed work. It not only effects an economy for this reason, but also from the fact that a considerable saving in the workman's time may be made and the cost of the staples themselves is low.

To the plain staple there are numerous practical objections. It is likely to bend or turn when driven, and thus fail to secure a grip strong enough to securely hold wires of the size commonly used for telephone work. If used on paired or triple wire the staple cannot be used over the whole group of wires without introducing the danger of a cross, or, at least, a point of poor insulation. This is sometimes obviated by driving the staple over a single wire, but this method does not properly hold the run in place, and the wire soon sags, presenting a very unattractive appearance.



The Blake Insulated Staples May Be Used to Neatly and Firmly Fasten Single, Paired or Triple Wires.

The difficulties mentioned have been overcome in the Blake Insulated Staples, made by the Blake Signal and Manufacturing Company, 246 Summer street, Boston, Mass. These are standard, square shouldered staples, with good driving qualities. By a special process a fibre-insulated strip is attached to each staple, in a manner which may be clearly understood from the illustration. This provides a double thickness beneath the head of the staple, which, in addition to its insulating properties, gives a large surface of contact with the wire. When stringing long lines of wire the end staples will hold the slack until the wire is secured at intermediate points. The insulation gives an added protection on leaks to ground if the wire happens to be in a damp place, and enables the staple to be driven over two or more wires without danger of producing a cross. The staples are tinned to prevent corrosion. The insulation is made of gray fibre, unless black or red fibre is specified. The gray fibre is recommended by the manufacturers, as it it without coloring matter, although colored material can be readily furnished if desired.

The illustration shows the staples in use upon three standard wire combinations. The staples and wires are reproduced in the exact size of the original articles photographed. For managers who wish to secure a staple provided with an insulation that cannot come off in driving this will be a most satisfactory product. It is adapted for use not only on telephone wires, but for messenger call, annunciator and bell work, and, in fact, all low voltage interior wiring. The manufacturers state that wiring can be done with these staples in one-half the time required for cleat work, and that the staples cost less than the screws alone which are necessary for porcelain cleat work. They will furnish further information and prices upon receipt of inquiries.

THE MOUNTAIN STATE ELECTRICAL COMPANY, Wheeling, W. Va., is at present in an excellent position to quote prices and furnish its Hall type cable terminal. During the past year this terminal had a very large sale and is being used by many of the important companies in the country. It is expected that the demand will be greatly increased this year, and the company would therefore suggest that parties contemplating cable construction and extensions place their orders early to insure prompt delivery. Full particulars respecting this apparatus will be furnished upon request.

THE TOLEDO STORAGE BATTERY COMPANY of Toledo, O., has decided to erect a new building. The present quarters have become entirely too small for the concern's business, and it is expected that work on the new plant will begin in the early part of the summer. The structure, when completed, will give several times as much space as the present quarters. The officers of the company, which was organized recently to take over the business of the Toledo Storage Battery & Electric Company, are as follows: President, C. E. B. Lamson; vice president, C. A. Byers; secretary and general manager, L. B. Hamilton; superintendent, George J. Miller. The board of directors are the above and Joseph M. Grasser, L. A. Alexander and J. Tyler Green.

THE FAIRBURY TELEPHONE COMPANY, of Fairbury, Neb., which has just successfully completed one of the hottest telephone fights in the history of competition, is indicating aggressive tendencies by putting the Baird secret service system on its party lines. The company intends to make use of all facilities which will aid it in giving a most satisfactory service to its subscribers.

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We don't make Everything; but we make a few Good Things and Make Them Right.

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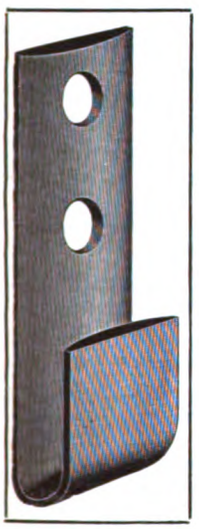

The peculiar form of the metal gives great strength.

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Hot Process Galvanizing guaranteed to stand the acid test.

It saves repair bills.

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The **"NORTON" Forged Cable Bracket**

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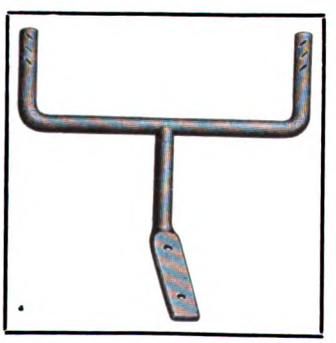
Furnished Japanned or Galvanized; Points Round or Flat as desired.



Other styles made to Order or Specification.

Write for Catalogue and Net Prices.

NORTON TOOL CO.

Electrical Department West Park, Ohio

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WE ARE TALKING TO YOU FROM CHICAGO

WE WANT TO TELL YOU

THE

FARR TELEPHONE & CONST. SUPPLY CO.

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CAN SAVE YOU MONEY

SEND FOR OUR CATALOGUE

AND PRICES ON TELEPHONES, SWITCHBOARDS, LINE CONSTRUCTION MATERIAL AND LINEMEN'S TOOLS.

WE MAKE IT A BUSINESS.

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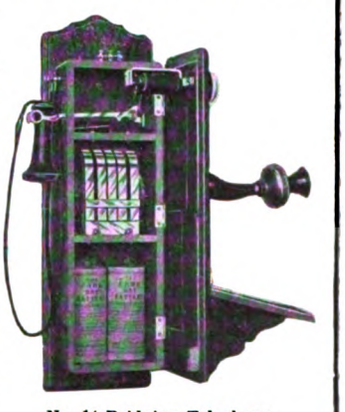
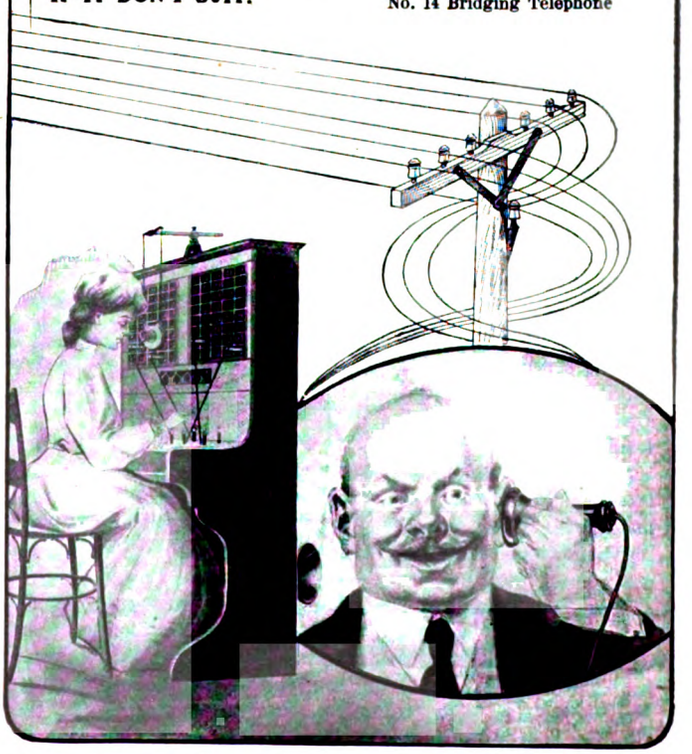
WE WILL OPEN AN ACCOUNT WITH YOU AND SHIP YOUR ORDER SAME DAY RECEIVED.

SEND FOR ONE OF OUR EXCHANGE OR TOLL LINE TELEPHONES ON 30 DAYS' TRIAL. RETURN AT OUR EXPENSE IF IT DON'T SUIT.



No. 14 Bridging Telephone



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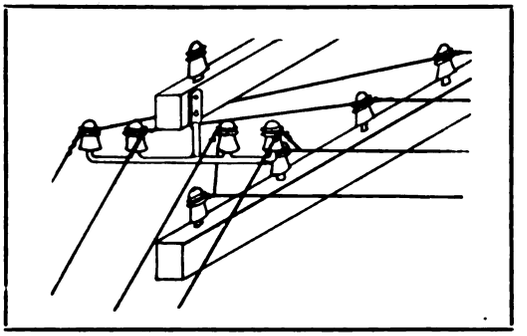
IN THE MANUFACTURING FIELD

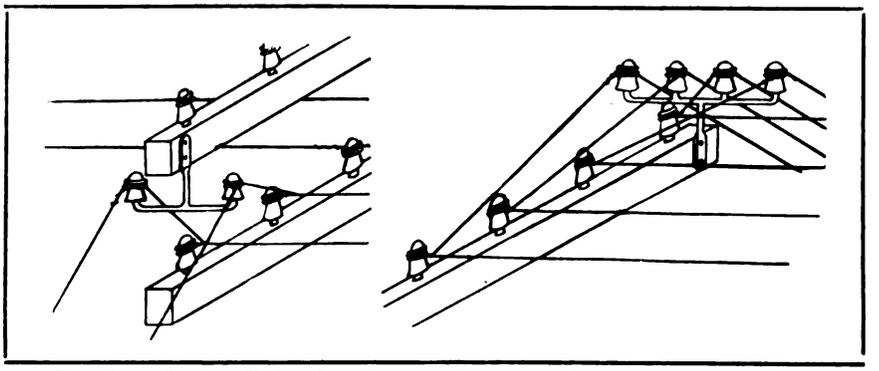
AUXILIARY POLE BRACKETS.

FOR taking off taps to subscribers' stations, or leads on party lines, and making turns where part of the wires upon a cross-arm continue straight ahead and the remainder are led down a side street, the use of a metal cross arm bracket presents some very definite advantages. It enables the wires to be taken off in a manner which presents a very sightly appearance, and this makes it especially satisfactory for use on open wire lines in thickly settled districts. The wires may be taken off in a line parallel to the cross-arm by their use, and this is frequently desired, as it lends itself to neat and workmanlike construction, without incurring the danger of a loop cross by too near approach of the separate conductors.



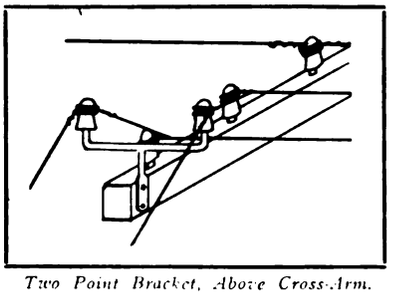
Four Point Bracket Set Beneath Cross-Arm.

The Norton Tool Company, of West Park, O., makes brackets which may be clamped on cross-arms in such a manner as to extend either above or below the arm. These are designed to have sufficient strength to stand any strain which may be put upon them by an ordinary length of span, even under extremely severe conditions. The illustrations upon this page show the methods of applying the two point and four point brackets to cross-arms, and give an idea of the appearance of this form of construction. As it not only improves the appearance of the line, but is likely to effect economies, by doing away with the use at these points of insulated wire which is likely to deteriorate, and by diminishing the frequency of crosses or low insulation at junction poles, the use of these brackets should be a valuable feature on line work in many places. The company manufactures a line of brackets, clamps and hangers, in which especial attention is paid to securing material and workmanship of the highest grade, as well as doing special work to order. It will be pleased to furnish further information and prices to all persons interested.



Two Point Bracket, Under Cross-Arm. *Four Point Bracket, Standing Above Arm.*

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, recently installed a special type Despatcher's switchboard for the St. Louis & Springfield Railway Company at Staunton, Ill. It is especially arranged to meet exacting conditions.



Two Point Bracket, Above Cross-Arm.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., and Chicago, Ill., is distributing an artistic folder which describes its new transmitter. This instrument is a radical departure from any heretofore devised and, the manufacturers claim, embodies the most approved details of transmitter design. Chief among these is the increased range of resistance variation, which especially fits it for long distance transmission, as well as extremely satisfactory work on short lines. The results of a long series of experiments are embodied in the arrangements of the parts which are contained within a heavy brass case. No pains have been spared to make this transmitter as nearly perfect as possible, and in the description furnished in the folder every part is clearly described. Copies may be obtained from the company on request.

THE ELECTRIC APPLIANCE COMPANY, Chicago and San Francisco, is manufacturing a special switchboard cord known as the Eaco. Each conductor consists of a highest grade piano steel wire surrounded with a spiral of fine copper wire. A covering of cotton braid is then placed on the wire; one of each pair having a distinguishing thread for bracing purposes. The wires are laid in position and protected by a covering of silk and cotton. They are then formed into a spiral and enclosed in a final covering of heavy waxed gray Gilling thread. On account of the combination of steel and copper the manufacturers claim to secure a cord which has an exceptionally long life with high conductivity. Prices and further particulars will be furnished upon request.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., is meeting with an increasing demand for its common battery type instruments. Bulletins describing this apparatus will be sent upon request.

A PRIVATE LONG DISTANCE WIRE.

THE Standard Underground Cable Company has leased the exclusive use of an all copper line to connect its general offices and the factories at Pittsburg, branch offices at New York and Philadelphia and its Eastern factories at Perth Amboy. This private line will be available for either telegraph or telephone service. There could be no better evidence of the large aggregate volume of business and the growing condition of this important manufacturing company, for so far as known this will be the longest exclusive wire owned or operated by any company confining itself to the manufacture of copper wire and cables. This service went into effect January 1st, 1906, and while without doubt of great convenience and value to the company in facilitating communication between its offices and factories and the important market centers of New York, Philadelphia and Pittsburg, it is installed primarily to enable it to place itself in closer touch with its customers and to give these customers the same quick service that would be possible if its general offices were located in each of these cities instead of in one.

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AIBMULOC

There is something wrong with that word. It isn't put together right. If you spell it backwards it will form the word "Columbia," the name of our telephones. It's just the same way with many of the telephones on the market. They have all the parts but they are not put together right. That's where they differ from ours.

When you buy a "Columbia" you get an instrument that is right all the way through.
You don't get a piano finish on the outside and a scrap heap on the inside.
Every part is built for efficient service under all conditions and it stays that way.
We'd like to have you write us for prices, we are sure you will never regret so doing.
We will buy your old telephones and switchboards.

EDISON TELEPHONE CO., 60-68 W. VAN BUREN STREET CHICAGO ILLINOIS

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ROCK ISLAND
NEW PATENT
DRY CELLS

ROCK ISLAND BATTERY CO.
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COPPER IS HIGH

I sell the Rubber Covered Telephone Wires and Cables made by the Marion Insulated Wire and Rubber Co.

I can deliver promptly at the lowest prices.

I. A. BENNETT
141 South Clinton Street
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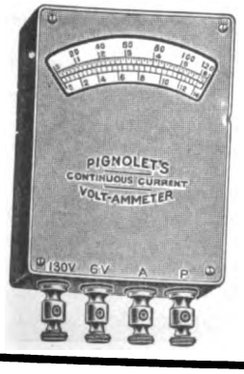
CHEAP VS. EFFICIENT SERVICE



The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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THE WEEK'S MESSAGES

FINANCIAL.

ALMA, MICH.—The Union Telephone Company, of Alma, has increased its capital stock from $500,000 to $750,000.

TILDEN, NEB.—The Tilden Telephone Company has increased its capital stock from $3,000 to $6,000.

NORTHWOOD, N. Y.—The West Canada Remsen & West Canada Creek Telephone Company, Northwood, has declared a 7 per cent. annual dividend.

MONROE, WIS.—The Monroe Telephone Company has increased its capital stock from $25,000 to $36,000.

THERESA, WIS.—The Theresa Union Telephone Company has increased its capital stock from $5,000 to $22,500.

FRANCHISES.

MILLSTADT, ILL.—The Farmers' Mutual Telephone Company has applied for a franchise to install an exchange at Millstadt, connecting with its party lines.

BERGEN, N. Y.—The Inter-Ocean Telephone Company has been granted permission to enter Bergen, connecting Le Roy and other places with Bergen.

COMBINATIONS.

FORT DODGE, IA.—The Fort Dodge Telephone Company has purchased the telephone system formerly owned by Ware and Leland. The Fort Dodge Company is installing a new switchboard that will handle double the toll service. It is to have a copper circuit to Dubuque, and three distinct routes into Des Moines.

SHEFFIELD, IA.—The People's Mutual Telephone Company, that operates toll lines and exchanges between and at several towns in Franklin and Cerro Gordo counties, has been sold to a new syndicate headed by C. F. Johnson. Associated with Mr. Johnson are E. N. Egge, of Rockwell, and C. M. Felland, of Joyce, Ia. Mr. Egge will be the new manager of the company, and the headquarters of the company will be moved from Hampton to Sheffield.

TAMA, IA.—C. W. Smith, former owner of the Tama Telephone Company, has bought from W. D. Spayth the Toledo exchange and lines. The system will be put in first class condition.

FORESTVILLE, N. Y.—The Hanover Telephone Company, owned by Silver Creek parties, has been transferred to the Inter-Ocean Telephone Company. The lines between Forestville and Silver Creek will be overhauled, and the exchange at Forestville considerably enlarged.

ELECTIONS.

BELVIDERE, ILL.—The Belvidere Telephone Company has elected the following directors: J. R. Balliet, F. S. Rowan, Wm. M. Marean, Geo. T. Keator and M. C. Marean.

GRAND MOUND, IA.—The Farmers' Mutual Telephone Company has elected the following officers: President, A. A. Barber; vice-president, A. M. Miller; secretary, John Mients; treasurer, Will Crowley; trustee, Henry Wieck.

HANLONTOWN, IA.—The Hanlontown Co-operative Telephone Company has elected the following officers: L. M. Gesme, president; N. N. Storre, vice-president; N. W. Phillips, secretary and treasurer.

HUBBARD, IA.—The Hubbard & Buckeye Telephone Company has elected the following officers: O. G. Lewison, president; Ed. Brightwell, vice-president; Herman Clute, secretary; T. Whaley, treasurer.

NORDNESS, IA.—The Nordness Telephone Company has elected the following officers: President, O. O. Lomen; manager, J. Brown; auditor, O. J. Thorgrimson.

BELLEVUE, O.—The Bellevue Telephone Company has elected the following officers: President, P. A. Knapp; vice-president, J. P. Ruffing; secretary, Fred Wolfrim; treasurer, J. H. Beattie.

WELLSBORO, PA.—The Farmers' Mutual Telephone Company has elected the following officers: President, Francis Kelley; vice-president, J. F. Haverly; secretary, Fred. H. Niles.

LACOHNER, WASH.—The Skagit Valley Telephone Company has elected the following officers: S. P. Kendall, president; O. J. Viurgren, secretary; N. A. Nelson, treasurer.

EVANSVILLE, WIS.—The Evansville Telephone Company has elected the following officers: A. S. Baker, president; A. C. Gray, vice-president; R. M. Richmond, secretary; Geo. L. Pullen, treasurer; G. W. Leyda, superintendent.

NEW COMPANIES.

MONTEZUMA, GA.—The Montezuma & Oglethorpe Company has been incorporated with a capital stock of $5,000.

ELBA, ILL.—The North Elba Telephone Company has been organized with the following officers: President, F. E. Potts; secretary Richard Murphy; treasurer, J. C. Breece. The company will build and operate a line between Elba and Williamsfield.

FLAGG CENTER, ILL.—The Farmers' Telephone Company, of Flagg Center, has been incorporated with a capital stock of $2,500. Incorporators: A. J. Bain, John Weiner and A. E. Slaughter.

TREMONT, ILL.—The Peoria, Pekin & Tremont Telephone Company has been incorporated with a capital stock of $2,500. Incorporators: A. J. Davis, Walter H. Ames and S. A. Hayward.

CRANDALL, IND.—The Excelsior Telephone Company, of Crandall, Ind., has been incorporated with a capital stock of $6,000. The company will establish an exchange in Crandall, and telephone lines throughout Harrison, Floyer, Orange, Washington and Crawford counties. John W. Gresham, chairman Board of trustees.

EVANSVILLE, IND.—The Citizens' Telephone Company, of Evansville, has been incorporated with a capital stock of $10,000. The company proposes to establish an exchange in Evansville, and extend its lines throughout Vanderburg and adjacent counties. Albert T. Karges, A. P. Lahr and others directors.

EXLINE, IA.—The Caldwell Mutual Telephone Company, with its principal place of business at Exline, has been incorporated with a capital stock of $1,000. The officers are as follows: President, F. M. Tull, Exline, Ia.; vice-president, Wm. Traxler, Exline, Ia.; secretary, John Leonard, Cincinnati, Ia.; treasurer, Euras Johnson, Exline, Ia.

KNOX, IA.—The Knox Mutual Telephone Company has been incorporated with a capital stock of $10,000. E. S. Murphy and others are the incorporators.

SEDAN, MINN.—The Sedan Telephone Company, of Sedan, Minn., has been incorporated with a capital stock of $2,500. Incorporators are William Wolfe, Henry Hess, W. E. Martin, of Sedan; A. Woodhall and M. C. Whitney, of Grove Lake.

CALDWELL, O.—The Noble County Telephone Company, Caldwell, has been incorporated with a capital stock of $100,000. Incorporators are F. H. Kuntz, P. H. Bowson, J. S. Jones, W. P. Shively and L. W. Wheeler.

NEW LEXINGTON, O.—The Citizens' Independent Telephone Company has been incorporated with a capital stock of $50,000. Incorporators: J. B. Rhodes, T. J. Smith, Charles H. Bell, J. W. Fry and J. G. Morris.

CARR, OKLA.—The Carr Gin, Milling & Telephone Company, at Carr, Day Co., Okla., has been incorporated with a capital stock of $6,000. The directors are: E. R. Black, A. Black, H. W. Carr, A. Standlee and J. J. Neally, all of Stone, Okla.

CLYDE, OKLA.—The Lyle and Clyde Telephone Company, of Clyde, has been incorporated with a capital stock of $10,000. Incorporators: William Wilson; Lester Lum and Fred Gum.

HEADRICK, OKLA.—The Navajo Telephone Company, of Headrick, has been incorporated with a capital stock of $1,000. The incorporators are W. J. Hastings, Jonathan F. Knox and others. The company will build a line from Headrick to Warner.

EAST HANOVER, PA.—An Independent Telephone Company has been

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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OUR MOTTO—QUALITY AND PROMPT SHIPMENTS.

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All shipments are prompt, subject only to car supply.

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The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

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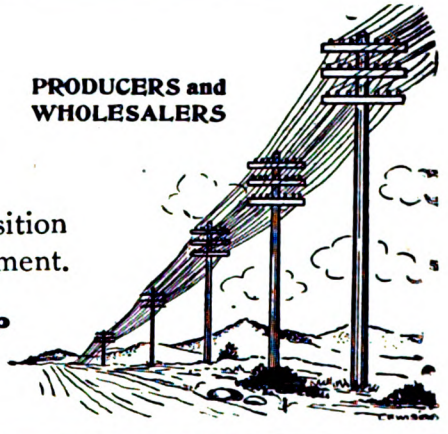
ESCANABA, MICHIGAN.

PRODUCERS and WHOLESALERS

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

"From the Stump to the Line."



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Upon a foundation of SQUARE DEALING we have built a pole business excelled by none. Our reputation is of more importance than your order, therefore if you buy from us, you will be assured of getting what you want.

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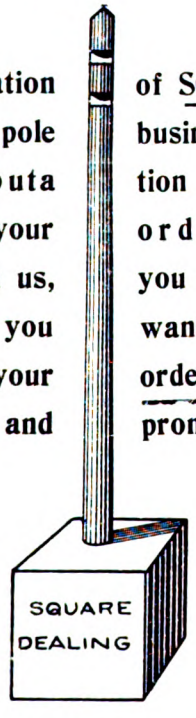

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Sand Point, Idaho

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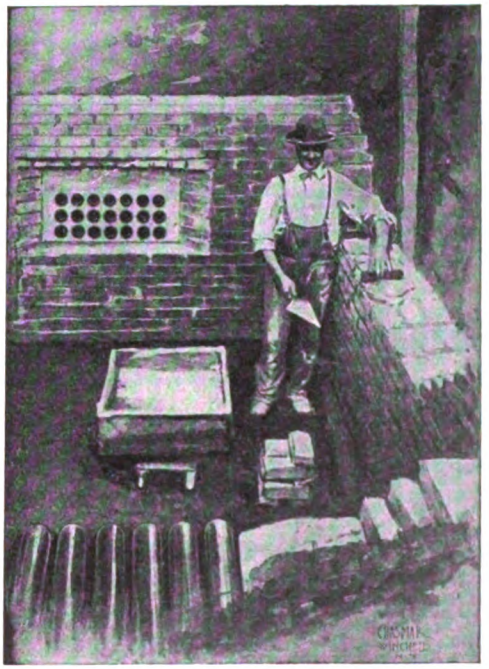

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THE WEEK'S MESSAGES

organized at East Hanover, with the following officers: President, A. S. Rank; secretary, J. R. Mader; assistant secretary, S. N. Ulrich; treasurer, Samuel Fry. The company has applied for a charter, and, as soon as it is granted, the company will begin the erection of a line between Jonestown and Grantville.

BONESTEEL, S. D.—The Gregory County Interstate Telephone Company, at Bonesteel, has been incorporated with a capital stock of $100,000. The company's lines will cover practically every town in Gregory County, with an estimated length of one hundred miles. The incorporators are M. Krotter and S. M. Lindley, of Bonesteel; C. A. Johnson, Fairfax; L. Simons, Herrick; R. A. Jackson, Dallas; N. E. Gardner, Gregory, and others.

CASCADE SPRINGS, S. D.—J. G. Neith and Fred Noerenberg, of Cascade Springs, have organized a telephone company to build a line from Hot Springs to Cascade Springs, and out into the Hot Creek County.

HENRY, S. D.—The Union Telephone Company has been incorporated with a capital stock of $10,000. Incorporators: John T. Belk, Henry A. Hanson, Nels M. Hanson and Ernest Roinecke.

HITCHCOCK, S. D.—The Pioneer Rural Telephone Company has been incorporated with a capital stock of $5,000.

HOT SPRINGS, S. D.—The Fall River Rural Telephone Company, at Hot Springs, has been incorporated with a capital stock of $30,000. Incorporators are D. O. Kimball, Jacob Burg, W. C. Timma, Thomas Getty, of Hot Springs.

LANGFORD, S. D.—The Langford Telephone Company has been incorporated with a capital stock of $22,500. The company will operate in the counties of Marshall, Day, Roberts and Brown. The incorporators are C. W. Platt, J. F. D. Cook, Howard Platt, C. B. Hersey, W. H. Sherrard and others at Langford.

LILLY, S. D.—The Lilly Local Telephone Company has been incorporated with a capital stock of $3,750.

MENNO, S. D.—The Menno Rural Telephone Company has been incorporated with a capital stock of $25,000. Incorporators: G. Munsmer, N. H. Claggett and Peter Gundmunson.

VALLEY SPRINGS, S. D.—The Red Rock Telephone Company has been incorporated with a capital stock of $1,500. Incorporators are A. L. Spies, Elmer Olson, Valley Springs; O. E. Fanske, Colman; N. N. Graff, Martin Lee, Brandon.

PECOS CITY, TEX.—The Reeves County Telephone Company, of Pecos, has been incorporated with a capital stock of $2,000. Incorporators are W. C. Kelly, R. S. Johnson and W. D. Cowan.

BICKLETON, WASH.—The Eastern Klickitat Telephone Company has been organized, with headquarters at Bickleton. R. E. Jackson, of Bickleton is one of the incorporators.. The company is to build a line from Bickleton to Cleveland.

BLUE CREEK, WASH.—The Blue Creek & Columbia Telephone Company has been organized with the following officers: B. Oppenheimer, president; C. W. Stanley, vice president; A. N. Anderson, secretary; C. G. Denison, treasurer. The company will build and operate lines between Blue Creek and Bissell, Cedonia and other points along the Columbia River.

REEDY, W. VA.—The Reedy & Spring Creek Telephone Company has been incorporated with a capital stock of $5,000.

COLOMA, WIS.—The Coloma Telephone Company, Coloma, has been incorporated with a capital stock of $3,000. Incorporators are F. W. Ploetz, J. N. Spalding, W. F. Gray and James A. Shorey.

HALE, WIS.—The Pleasant Valley Telephone Company, town of Hale, Trempealeau County, has been incorporated with a capital stock of $4,000. Incorporators: Leo L. Swain and others.

PERSONAL.

FRANK C. ADAMSON, formerly wire chief in the Michigan State Telephone Company's exchange at Detroit, has accepted a position as chief inspector with the Delaware and Atlantic Telephone and Telegraph Company.

J. SANDFORD BUCK has been appointed manager for the Rocky Mountain Bell Telephone Company at Missoula, Mont.

W. C. BUELL, formerly of Atlantic City, has accepted the position of division superintendent with the Interstate Telephone Company, with offices at Millville, N. J. The Millville District comprises all of Cumberland and part of Salem and Cape May counties.

CHRISTOPHER BUSSE, of Troy, Ind., has recently bought the Troy Telephone Company. The company has about 100 subscribers and secures toll connections over the lines of the Kinloch system.

ROBERT A. DAVIDSON has been appointed manager for the telephone company at Cheyenne, Wyo.

E. M. FORD, manager for the Wabash Valley Telephone Company at Effingham, Ill., has tendered his resignation. He will represent The Dean Electric Company in Illinois this year.

GEORGE A. FRENCH, formerly of the Southern New England Telephone Company, has been appointed superintendent of the Duluth and Mesaba Telephone companies, with headquarters at Duluth, Minn.

JAMES W. KRIEGER has been appointed local manager of the Consolidated Telephone Company at Pittston, Pa.

NED MATTERN has been appointed traffic manager for the Consolidated Telephone Companies with headquarters in Allentown, Pa.

A. V. SANBORN has been elected general manager of the Jewell County Telephone Company at Jewell, Kan.

MISCELLANEOUS.

FARIBAULT, MINN.—The Rice County Rural Telephone Company has issued a new telephone directory of thirty pages. It contains the usual instructions, a map showing the connections of the Tri-State Telegraph and Telephone companies, and has 765 local names classified and 13 which came in too late for classification, and 52 names on the rural lines running into Warsaw, Walcott, Shieldsville, Cannon City and elsewhere.

New Construction in the Field

STEPHENS, ARK.—T. A. Lewis and Gus Lewis have secured a franchise, and will build and operate a telephone system at Stephens.

DELTA, COLO.—The Delta County Co-operative Telephone Company contemplates the construction of many farmers' lines, and a number of improvements to its present system.

BOONE, IA.—The Boone County Telephone Company is to install about 20,000 ft. of cable in Boone and Ames. The improvement will cost in the neighborhood of $15,000. Additional improvements are also planned for the year.

DAYTON, IA.—The Dayton Telephone Company expects to extend its lines in the near future.

CAMBRIDGE, KAN.—The Pleasant Ridge Telephone Company is to construct fourteen miles of additional trunk line.

LEAVENWORTH, KAN.—The People's Telephone Company's system is to undergo a thorough modernization, including the installation of new instruments.

GLADSTONE, MICH.—The Finch Telephone Company of Escanaba, is to build a line to Gladstone, and install an exchange at that place.

STAPLES, MINN.—The Cass County Telephone Company, which has just completed a line to Staples, is to build a line to Thomastown.

BANNISTER, MICH.—The Bannister Mutual Telephone Company is to commence at once the construction of a line running west from the town.

HAVRE, MONT.—The Havre-Box Elder Telephone Company is to build a line thirty miles long, connecting Havre with Bear Paws. The company also plans to make connections with the Chinook-Lloyd line at Chinook.

WHITNEY POINT, N. Y.—The Chenango Valley Telephone Company is building a line from Whitney Point to Itasca.

ASHLEY, O.—The Ashley Telephone Company is to build lines to Marengo, Shawton and other points.

FORT SENECA, O.—The Farmers' Mutual Telephone Company is to build a line from Fort Seneca to Tiffin.

KENTON, O.—The Kenton Telephone Company is to build a farmers' line on Roundhead Pike.

SCHOLLS, ORE.—The Scholls Telephone Company is to have all its lines centralized to one point, and be connected direct with Portland by the Home Telephone Company.

BERLIN, PA.—The Berlin Telephone Company is to build a line to Nickleville and Kossuth.

CONESTOGA, PA.—The Conestoga Telephone Company is extending its lines to Stonersville and Yellow House.

VIBORG, S. D.—The Viborg & Center Point Telephone Company, which has recently completed a line between Viborg and Irene, is to build a line through to Centerville.

McKINNEY, TEX.—The Independent Telephone Company, which has recently been granted a franchise at McKinney, is to establish an exchange at that point.

EVERETT, WASH.—The Farmers' Independent Telephone Company is to install an up-to-date service at Everett.

BENWOOD, W. VA.—The National Telephone Company is to place a new toll board in its office at Benwood, and also contemplates the erection of a line to Moundsville.

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25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US
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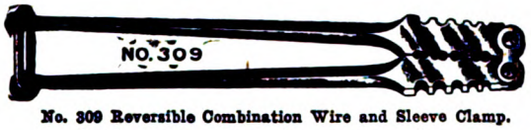

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OF ALL MAKES AND SIZES USED ON TELEPHONE APPARATUS. PRICES LOW AND WORK RETURNED PROMPTLY.
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Can be attached to any bridging generator.
Will work on both metallic and grounded lines
No push button. No extra wiring.
Complete Device, 50 cents each.
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Especially Designed For
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Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
Toll Tickets, Toll Station Journals, Toll Station Ledgers, Receipts for Toll Service, Monthly Check Reports, Coupon Books, Stock Certificates, Lease and Rental Records, Cash Books, Trouble Tickets, Rental Receipts, Voucher Checks, Exchange Directories, Fine Stationeries, Special Forms of All Kinds.
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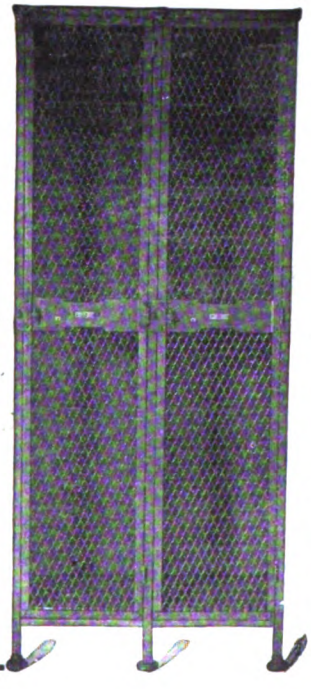

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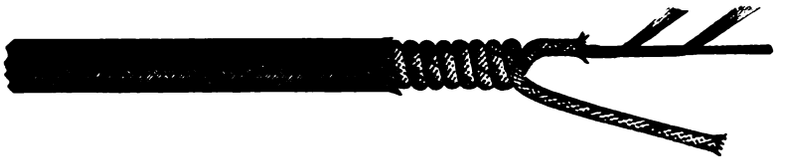

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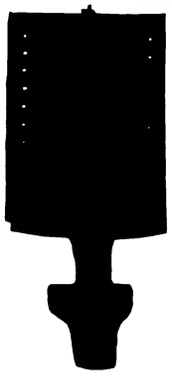
A HOME MADE DEVICE

may serve its purpose, but there are certain things that require expert knowledge in their design and construction. Take Cable Reel Wheels, for instance. They must be substantial to carry the heavy weights of cable and reels. They must be big enough to carry the largest reel, and they must be easily put together.

Ours have all these points and more, but we'd like to tell you about them by letter. We will say, however, that a complete equipment consists of a pair of six foot wheels with inside chafing plates, one 6-ft. reel bar, two outside locks to hold the wheels securely, and one adjustable tongue.

Our catalogue will tell you about several other devices that help make the manager's life more pleasurable. It's yours for the asking.

Hallett Iron Works, 92-96 West Polk Street CHICAGO, ILL.



SIDE BRACKET.

Patented

TYPE A—10-Pair Hall Cable Box.

CABLE TERMINAL EFFICIENCY.

A great deal of the efficiency of a cable plant depends upon the terminal and distribution facilities. And what is more, the type of terminal is of the greatest importance. Some of the points to be considered in its selection are protection, "getatability," compactness, rigidity. Considering these features collectively or individually you cannot find a terminal on the market that is superior to the HALL. Protection was given the greatest attention in its design so that when you buy a

HALL CABLE TERMINAL

you have bought protection against lightning, sneak currents, or crosses with dangerous circuits. The "getatability" of the Hall is unique. When the cover is taken off the top, bottom, front and back are exposed. No opportunity here for faulty inspection.

Compactness? Just look at the illustration. That tells its own story.

Rigidity? An all-metal framework carries the terminal plate. We couldn't make it stronger if we tried.

Seems to us you ought to get prices. Your name and address will bring them, and some more facts that will be of value to you.

THE MOUNTAIN STATE ELECTRICAL COMPANY,

Sole Manufacturers, ***WHEELING, WEST VIRGINIA.***

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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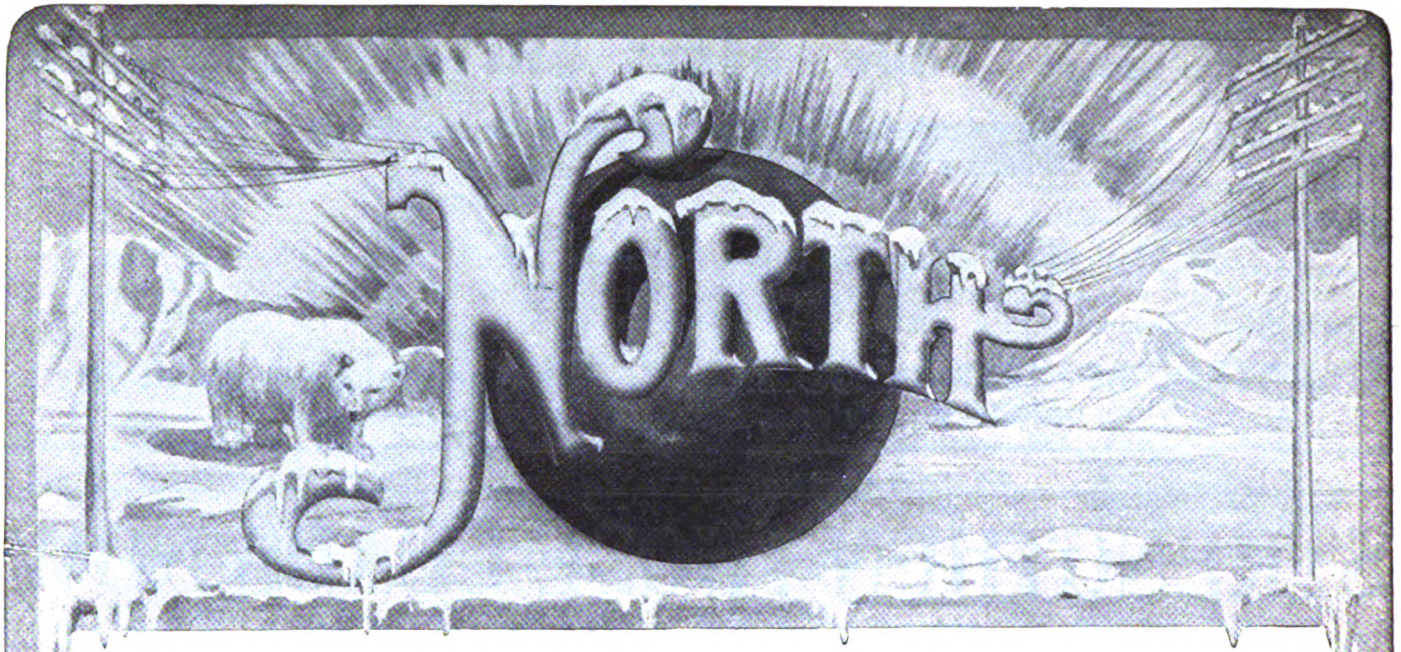

NORTH'S Solid Back Transmitter combines ample volume, perfect articulation, deep penetration and natural pitch. It reproduces the voice high or low, loud or soft—a loud voice without breaking or blurring.

The full round volume is attained by entirely eliminating dampening springs; there is no unequal pressure on one side of the diaphragm, which is dish-shaped for confining its action to the path of the voice vibrations.

A small amount of polished granular carbon in a specially formed shallow cell eliminates packing.

All parts are made in jigs and tested accurately to a ten-thousandth part of an inch and there are no accidental transmitters in the product.

Just as a precaution, though, they are tested by an engineer before leaving the factory, under conditions approximating actual service.

CHICAGO CLEVELAND DALLAS

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO

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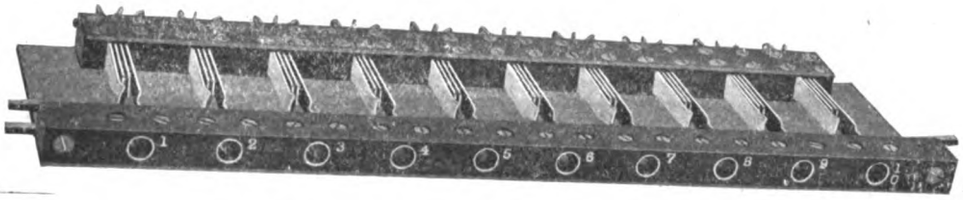
CENTURY
100% GOOD



Poorly Constructed Jacks Will Cause More Trouble and Bad Service Than Any Other Defective Switchboard Parts

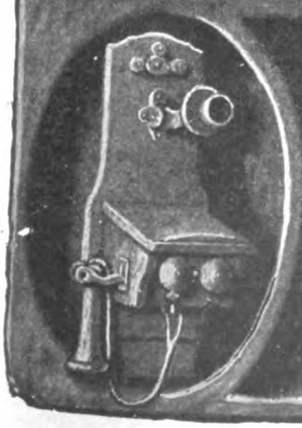
Cross talk, noisy connection, "cutting-out," and other troubles that cause subscribers' complaints, and cost money, may all be traced to poor and faulty jacks.

The jacks in our switchboards are perfect mechanically. All parts are accurately made by expensive tools. When these parts are assembled, they fit together as they should, without any strain. The springs are of the proper size and shape. The sleeves are reamed out to the correct diameter to fit the plug. All parts are securely fastened together. This construction assures absolutely perfect connections at all times.

All insulation is of the very best grade of hard rubber—the best insulation for the purpose. The insulation is heavy enough to withstand a very high electro-motive force. This assures perfect service, free from all cross-talk.

Mechanically and electrically, you will find our jacks perfect in every detail.

When you are figuring on a new switchboard, let us show you some of our product. We know we can interest you—and our prices are right.



CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

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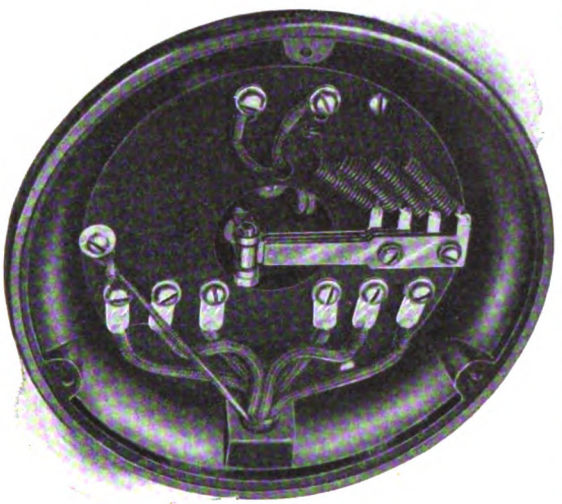
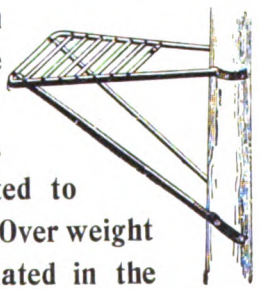
MONARCH APPARATUS
THE DESK SET

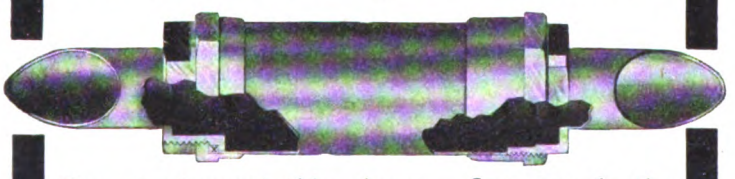


All wiring of a Monarch Desk Stand terminates in the base. The transmitter connections are metallic, and are brought down in two conductor silk cord. The hook switch springs being mounted upon the base, no other wiring passes through the pedestal tube. The connecting plate is made of hard rubber. All connections are plainly marked. Clips are provided for the receiver and connecting cords. All connecting plates are interchangeable. Local battery desk sets can be made to common battery by changing the connecting plates and transmitters. All Monarch Telephone Apparatus is described in the new catalogue. A copy will be sent upon request.

MONARCH TELEPHONE MFG. CO., 10-16 SOUTH CLINTON STREET CHICAGO, ILL.

Low Cost, Great Strength and Light Weight has made SECURITY POLE SEATS a Time and Money Saver. Weight only 28 lbs. Tested to 1000 lbs., will carry a ton. Over weight on poles is entirely eliminated in the Security Seat. Get the right seat. **Price $2.50 each.**





You can inspect this sleeve. Can you do the same with a wiped joint? This is water proof after inspection same as before. Cheap and easy to put in position. Expert cable man not needed. Send for Bulletin number 33-S.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK

THE F. BISSELL COMPANY,
TOLEDO, O.

BELDEN PRODUCTS

COPPER AND GERMAN SILVER MAGNET WIRE,
SWITCHBOARD AND JUMPER WIRE,
BRAIDED SLEEVING.
TELEPHONE AND ELECTRICAL CORDS
ROSIN CORE SOLDERS

1906 CATALOG IS NOW READY

BELDEN MANUFACTURING COMPANY
194 MICHIGAN STREET
CHICAGO

Andrews' Steel Rod Telephone
Operator's Revolving Chair

Steel Foot Rest—Seat and Back Readily Adjustable to Occupant—Height of Chair Easily Regulated. Frame work made of Bessemer Steel, ⅜ (three-eighths) inch Rods twisted and interwoven. Wood work, oak, birch or mahogany finish, as preferred. Metal work heavily plated, Japanese copper finish.

The Most Comfortable High Chair Made

The Most Attractive and Convenient

INDESTRUCTIBLE—Nothing to get Broken
24 in. high 28 in. high

Warranted for 10 years. Send for Complete Catalogue and Prices.

No. 75 M
Toll Board Chair

No. 78 M

The **A. H. Andrews Co.**
174-176 Wabash Ave., Chicago, U. S. A.

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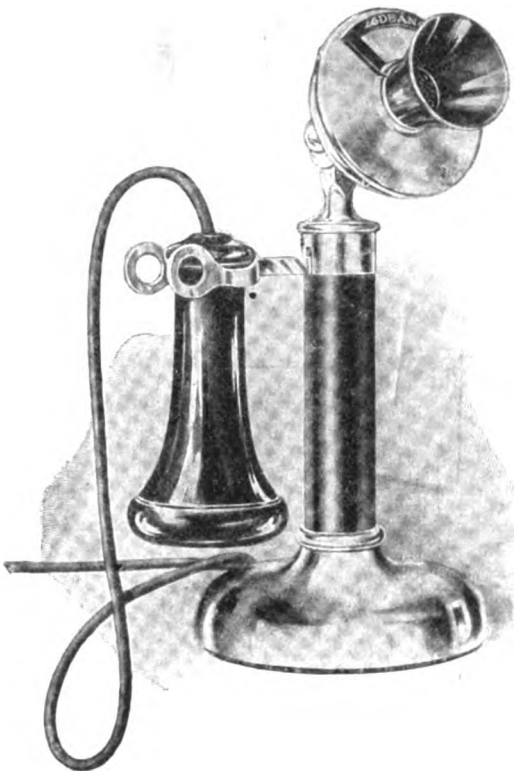
DEAN TELEPHONE APPARATUS

THE DEAN DESK STAND



The above illustration shows our Common Battery and Local Battery Desk Stand. There is nothing unusual about its external design, excepting plain lines with no crevices in which dirt can collect. But its internal mechanism and construction will bear careful study.

The inner framework is made from steel (no castings) rigidly put together.

The hook switch, contact springs, coil and connecting rack are mounted on a removable plate and located in the base—easy to inspect and not liable to get out of order. The wiring is carefully done.

The Common Battery Desk Stand only requires a two-conductor cord for connecting to its bell box.

The talking parts are full size standard Dean product capable of giving the best possible transmission.

The demand for this desk stand has heretofore been greater than our manufacturing capacity, the majority of the instruments having gone to the largest operating companies in this country—one exchange already having nearly 5,000 in operation. We have just greatly enlarged this part of our factory, and can now fill all orders promptly.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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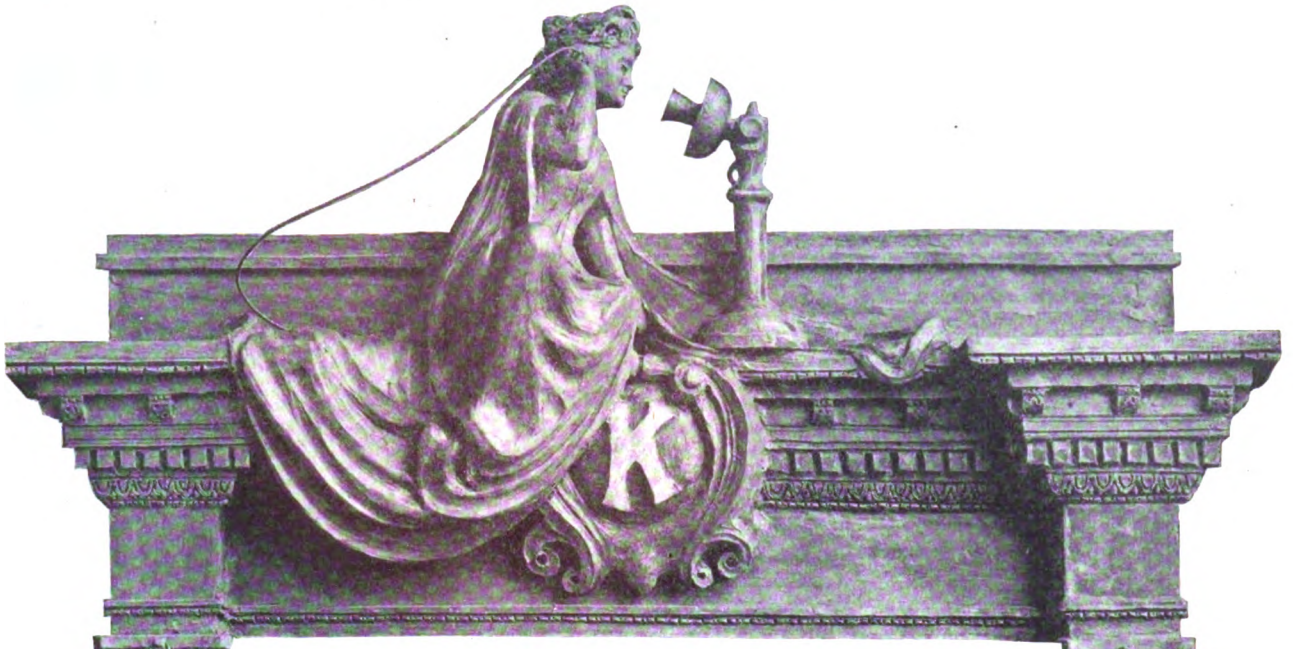


Our Frequency Pole Changer for Small 4-Party Line Magneto and Common Battery Exchanges will be on the Market soon. Come and see it in operation at our Factory

...THE...

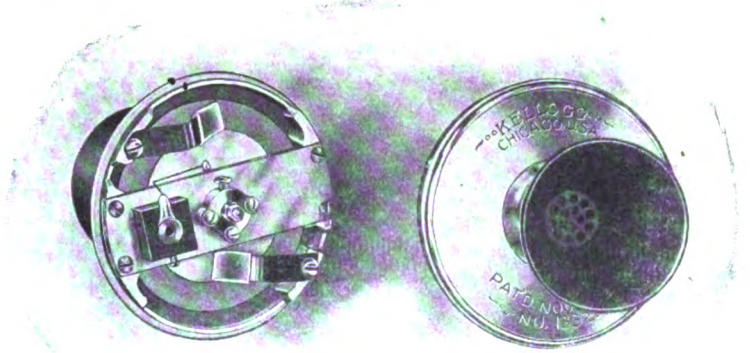
KELLOGG

REVERSE TYPE "SOLID BACK"

TRANSMITTER

HAS STOOD THE TEST OF TIME

It was in service five years ago
It has been in service ever since
It will be in service forever without change
A Kellogg Transmitter, once installed, never needs to be replaced



Back View. Front View.

Every telephone company has come to know that the transmitter is the most vital part of the entire system.

If a transmitter "falls down" and has to be exchanged, it is not the financial loss that counts, but it is the dissatisfaction of the subscribers that hurts the telephone company, and this dissatisfaction of the subscribers cannot be expressed in dollars and cents.

Send for catalogs. Correspondence solicited.

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

Congress and Green Streets, CHICAGO, ILL

BRANCHES

NEW YORK, N. Y. 116 Nassau Street
PHILADELPHIA, PA. Keystone Tel. Bldg.
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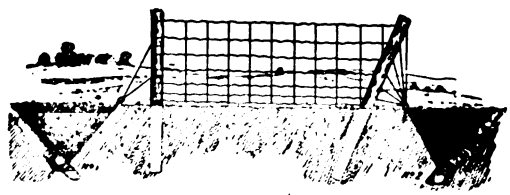
"Hercules" Anchors

MADE OF MALLEABLE IRON



"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

"HERCULES" Anchors will not creep.

Send for Prices and Circulars

The W. G. Nagel Electric Co.

28-32 ST. CLAIR ST. TOLEDO, O.

NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.
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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

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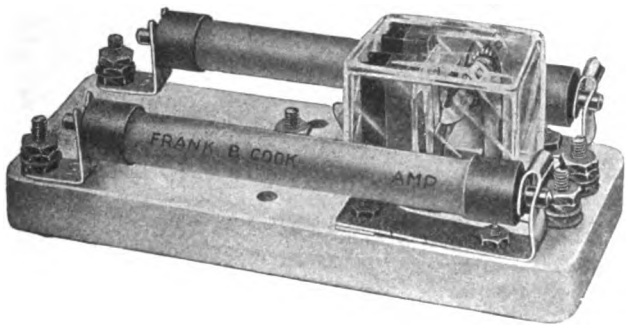
Cook's Subscriber's Station Protector

Approved and listed by the NATIONAL BOARD OF FIRE UNDERWRITERS.

Equipped with COOK'S NEW TUBULAR FUSE WHICH WILL NOT EXPLODE OR SPIT FIRE---also with Carbon Lightning Arresters and Self-Soldering Heat Coils.

Absolutely protects your instruments against lightning and against both strong and sneak currents.

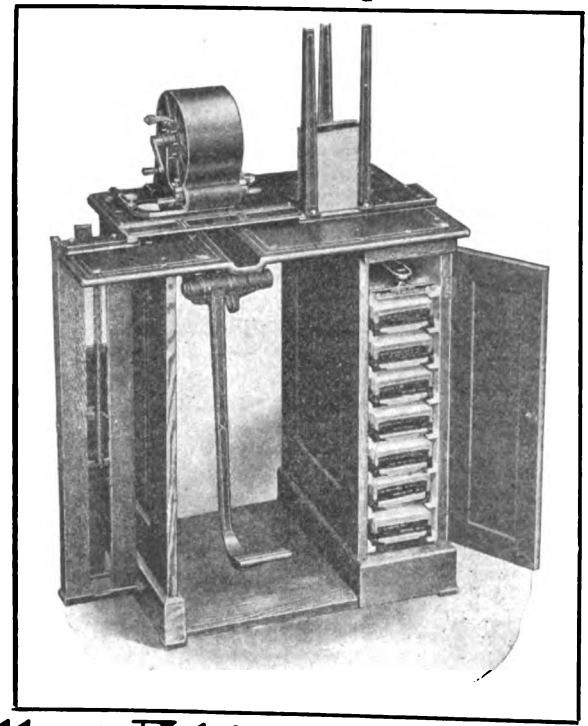


Ask for Type B4.

Frank B. Cook. Mfr.

238 West Lake Street CHICAGO, ILL.

Every Imprint from the Same



Solid Rubber Printing Roll on the

Elliott Addressing Machine

All addressing by even and regular pressure from one surface, easily cleaned, removed and replaced.

No Type To Fill

Stencils never require attention when properly handled. The pressure of the printing-roll removes all surplus ink.

No Pad Inking

The roller application and distribution of the printing-press produces the clearest and most legible address obtainable, and the inking is entirely under the control of the operator at all times. Write us.

Elliott Addressing Machine Co. 101 Purchase St., Boston, Mass.

New York Philadelphia Chicago Indianapolis St. Louis San Francisco

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YOU BUILD TOLL LINES

We make them Pay

One toll operator handles a large number of toll stations.

No code ringing.

No listening at sub-stations.

Let us tell you about it.

BAIRD MANUFACTURING CO.
No. 6 Michigan Street, Chicago

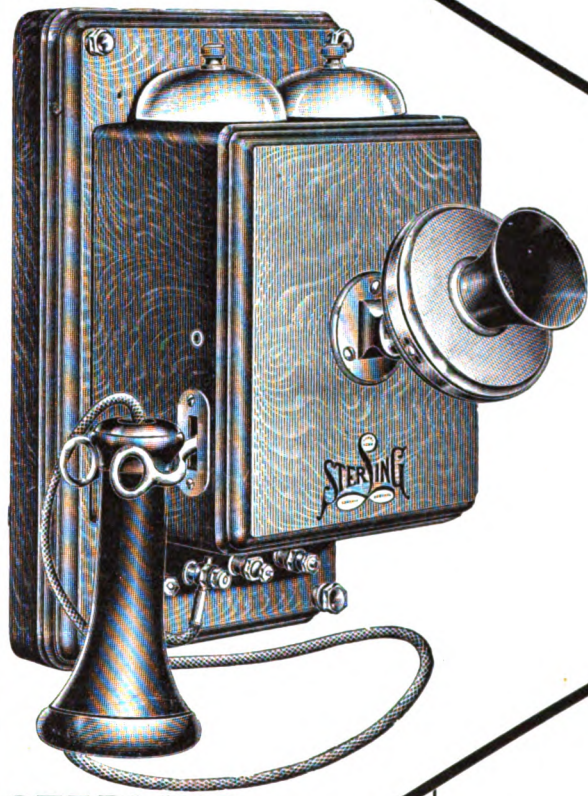
AUTOMATIC INTERCOMMUNICATING 'PHONE for EXCHANGE CONNECTION

EXTREMELY SUCCESSFUL.
NON-INTERFERING TRUNK BUTTON.
HARD RUBBER CONNECTIONS.
SWITCH NOT DEPENDING ON GRAVITY.
FOR COMMON OR LOCAL BATTERY EXCHANGES.
ABSOLUTELY NON-INTERFERING.

CONNECTICUT TELEPHONE & ELECTRIC CO.
MERIDEN, CONN., U. S. A.

STERLING ELECTRIC COMPANY

No. 20
COMMON BATTERY



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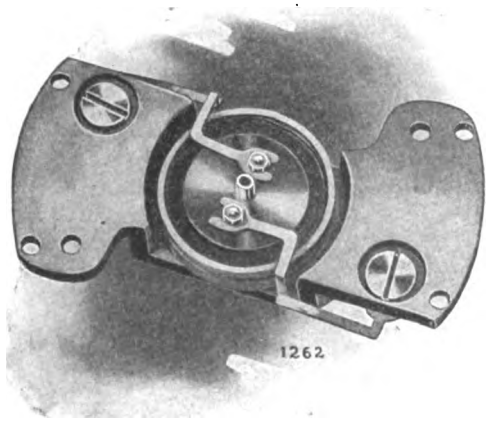
The Stromberg-Carlson Transmitter



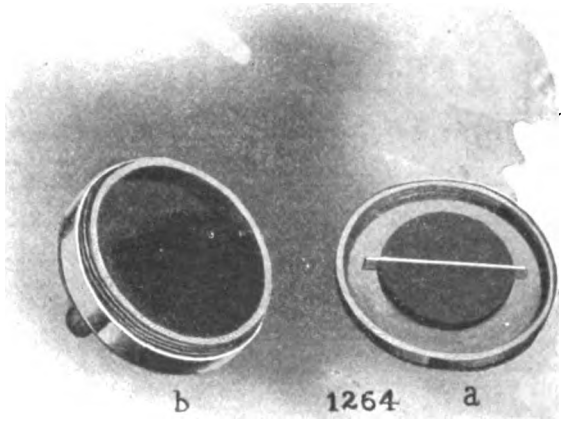
DIAPHRAGM WITH CONNECTORS AND CARBON CUP ATTACHED

Is decidedly different from any other you have ever seen. Different in ways that count for better transmission. This is quite noticeable when the transmitter is used on long distance lines. At a very slight cost you can prove this to your entire satisfaction.

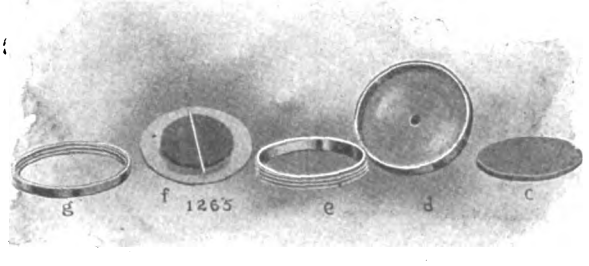
Why not do it?

THE ELECTRODES

Are made of carbon, and both are attached to the central point of the main diaphragm. There is thus produced a variation in the distance between the electrodes of twice the amplitude of variation of the central point of the main diaphragm. It is unnecessary to claim greater volume of transmission than if only one electrode moved.



CARBON CUP WITH CARBON REMOVED



PARTS OF CUP

We give the transmitter such an adjustment that under ordinary tones of voice the volume is not as loud as some of the forms of sensitive transmitters now on the market. As the voice is raised, however, the volume of transmission from the instrument is multiplied two-fold so that the transmission, when talking in a loud tone of voice, has much more volume than that of any other type. The advantage of this is readily seen.

Let us send you our new booklet describing and illustrating this transmitter. It tells the whole story; we mail it free. Just ask for Booklet No. 91-B.

Stromberg-Carlson Tel. Mfg. Co.

Rochester, N. Y. **Chicago, Ill.**

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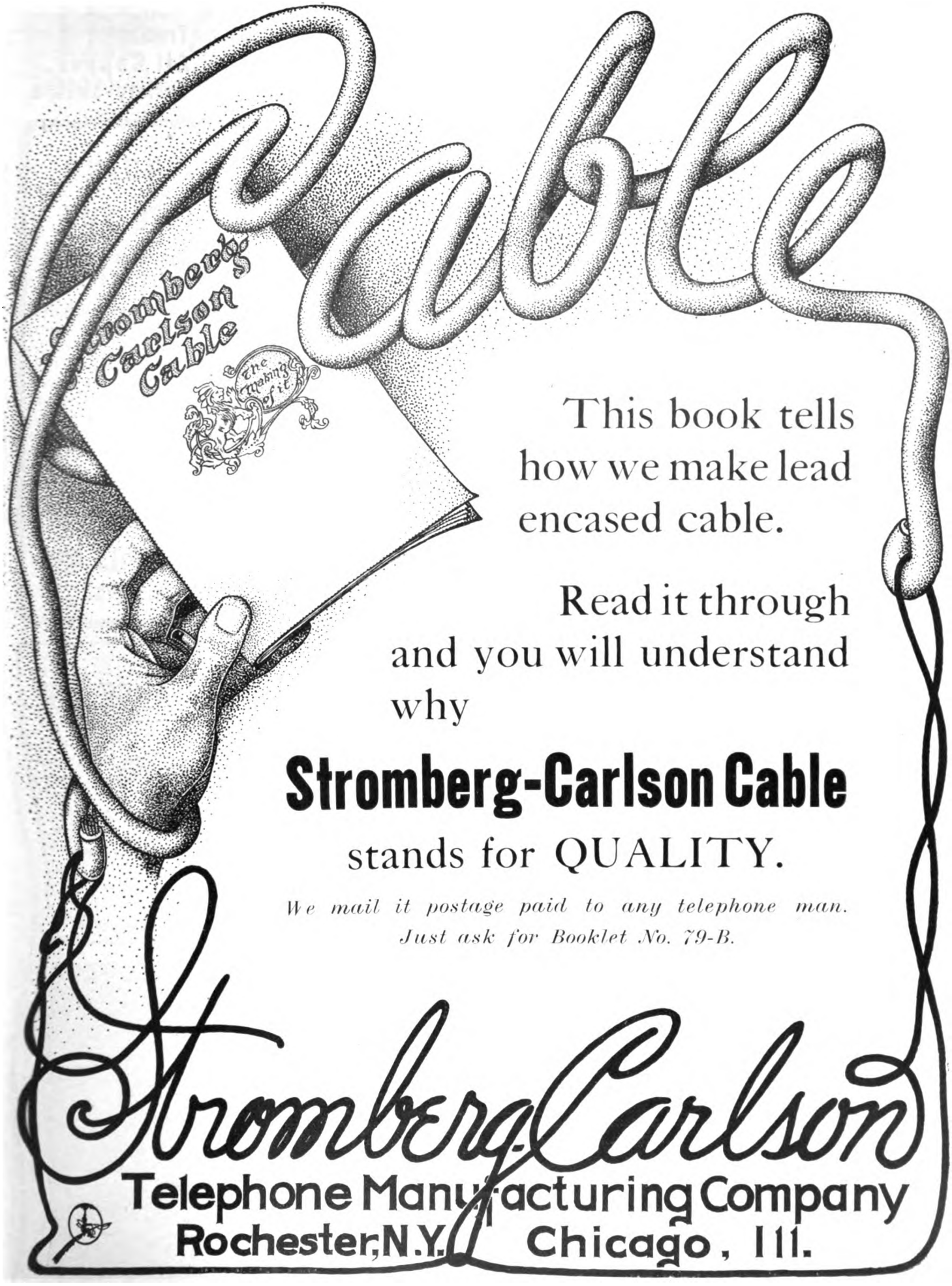

This book tells how we make lead encased cable.

Read it through and you will understand why

Stromberg-Carlson Cable

stands for QUALITY.

We mail it postage paid to any telephone man. Just ask for Booklet No. 79-B.

Stromberg-Carlson

Telephone Manufacturing Company

Rochester, N.Y. Chicago, Ill.

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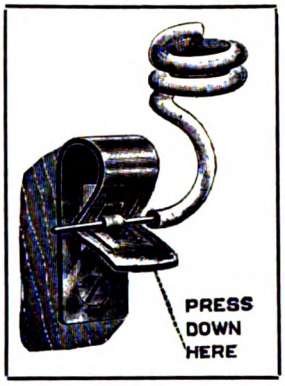
INDISPUTABLE FACTS

Euclid says that a straight line is one which lies evenly between its extreme points. No matter how you try, you can't gainsay that statement because it is a fact.

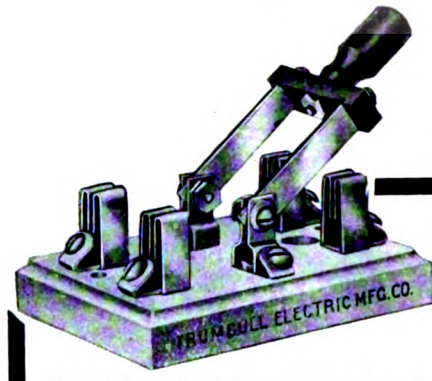


For the same reason, THE FAHNESTOCK SPRING BINDING POST is the best binding post made. If you have not discovered that fact, it is because you have not tried it. Reasons why it is the best are many. It is simple. Just a piece of brass bent into a special shape to form a spring clamp. It holds securely, because there is just a sufficient amount of tension to enable it to grip the wire tightly. It cannot cut, because the contact surfaces are designed to prevent this trouble. You have been using the old style screw post, and you know its faults. Don't you think it time that you substituted the Fahnestock?

Remember, YOU DON'T HAVE TO PAY A CENT MORE FOR BATTERIES SUPPLIED WITH IT, and you do save all the expense incurred by the faults of the screw post.

When you order your next lot of dry cells, specify FAHNESTOCK SPRING BINDING POST, or if you would like to see one first, *we'll send a sample free.*

FAHNESTOCK ELECTRIC CO., 132 Havemeyer St. BROOKLYN, N. Y.



Trumbull All Copper Battery Switch

GOING TO BUY

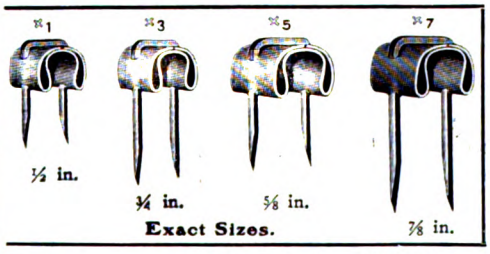
"BABY" KNIFE SWITCHES

Then you must get the Trumbull all-Copper Switch. It is immeasurably superior to any other type for several reasons. Note the shape of the contact springs. The inverted U formation gives greater elasticity and at the same time makes surer contact. No matter how carefully the porcelain bases are fired, some will warp slightly. In the old style switch this causes unequal contact between the blades and the springs and results in uneven wear. The Trumbull method of construction prevents this. Hadn't you better get posted upon switch details before buying. We can surprise you with facts and figures.

TRUMBULL ELECTRIC MFG. CO.

618 Woodford Ave., PLAINVILLE, CONN.

Blake Insulated Staples



Can be driven over two or more wires without danger of causing a cross.

Manufactured and for Sale by

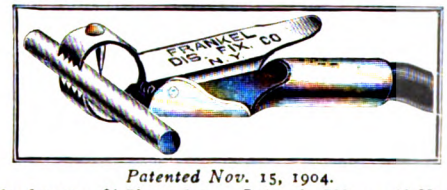
BLAKE SIGNAL & MFG. CO., 246 Summer Street BOSTON, MASS.

SELLING AGENTS:

S. H. Couch Co., Boston.
Newcomer-Manry Co., Atlanta, Ga.
American Elec. Supply Co., Chicago.
Wesco Supply Co., St. Louis.
Brooks-Follis Elec. Corpor., San Francisco,
Western Electric Company.

SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.

Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
Lots of 100.....11.00 per 100 Lots of 1000..... 9.00 per 100

GET out of that rut of skinning the wires—IT'S EXPENSIVE.
THIS device will save both valuable time and material—THAT'S PROFIT.
The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

FROM YOUR SUPPLY HOUSE, OR

FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

FARR LONG DISTANCE TELEPHONE FARR

We are Makers of Telephones

SPECIAL INDUCEMENT FOR 30 DAYS

We will send you 10 Bridging Telephones, our best 5 Bar Generators, 1600 Ohm Ringer Coils, Solid Back Transmitter, complete for $105.00 on 30 Days' Trial.

If not satisfactory, return to us at our expense.

1000 TELEPHONES ON HAND Orders Filled and Shipped Same Day Received.

FARR TELEPHONE & CONSTRUCTION SUPPLY CO.

118-120 W. JACKSON BOULEVARD, CHICAGO, ILL.

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries, $3.00 a year.

The American Telephone Journal

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VOLUME XIII *SATURDAY, FEBRUARY 24, 1906* *NUMBER 8*

The Telephone and the Sleeping Car

How the Traveler Secures a Berth from Any One of Numerous Offices, While the Ticket Agent is Able to Handle His Sales Without Large Reservations of Empty Space

By Robert G. White.

EXAMINE any business that you like, you will perhaps be surprised to find how dependent it is upon telephonic communication for its success. In railroad operation the telegraph has for a long time been the principal space and time annihilator, but the simplicity and flexibility of the telephone is rapidly being appreciated, and ere long it will have almost superseded the older scheme of communication. Of the manifold intricacies of this business there are few with which the general public is brought in contact, and of these, there is at least one which relies almost entirely upon the telephone for its association with the traveller.

The exigencies of modern commerce make it imperative that the business man shall spend as little as possible of his working hours away from a point where he can be readily reached by telephone, telegraph or messenger. For this reason railroad journeys of any length are always taken at a time when the major portion of the ride will occur after office hours. If the trip necessitates the spending of a night on the train, a berth or stateroom in a sleeping car is required. It is in the reservation of these accommodations that the telephone becomes almost indispensible, not only from the standpoint of the prospective passenger as a time saver, but also on the part of the railroad company, which has incorporated it in the system employed for the sale of these tickets.

Branch Ticket Office of the New York Central and Hudson River Railroad. Pullman reservations are made from this office by telephone.

All long distance trains, and many others which travel between important points, carry one or more Pullman cars. As the seating capacity in these cars is limited, it is generally necessary that the traveller shall secure his reservation in advance. This he must do by calling at the station, or if he resides in a large city, at the most convenient agency. To thoroughly understand the method of procedure a concrete example will be given in the case of a prospective passenger from New York to Chicago over the lines of the New York Central and Lake Shore Railroads.

In New York City the company maintains twelve branch offices for the sale of tickets besides the regular bureau in the Grand Central Station. Each office is supplied with the necessary railroad tickets and carries a supply of numbered Pullman checks. Each branch office is bridged on a special line, which terminates at the Pullman division in the Grand Central Station.

Here there are a series of pigeon holes, each containing diagrammatic charts of the different cars attached to every train for every day of the week. Each card is provided at the upper left hand corner with a ruled space in which the following information is placed: Car number, line, train number, time train leaves, terminal points and date. The lower portion of the card is a diagram of the berths; one side for upper, the other for lower. If staterooms are included these are noted at the foot. These cards are made up two months in advance, and it is not uncommon for a party having a journey on a certain date to reserve space early enough to be sure of getting the desired location. Talking with Mr. Lahm, the ticket agent at the Grand Central station, the writer was informed that the calls for upper berths were so rare as to be noteworthy. Since these form one-half of the capacity of the car, it will be apparent that an early reservation is important if one wants a lower berth.

Should the prospective passenger desire to ride on the Lake Shore limited, he can call up the nearest city agency and inform the officials of the desired accommodations. The clerk then calls

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the main office and finds out if such a space is available. If it is, the party calling is so informed and told it will be held for one hour, to give him time to get to the office and make the payment. At the same time his name is inserted in the space corresponding to the berth or stateroom he will occupy. At the time the tickets are bought the attendant again calls up the main office and gives the serial number of the Pullman check. This is then entered on the chart in the place of the passenger's name, and the car number and berth number and location are telephoned back. This information is then written on each of the four sections of the Pullman check, two of these being given to the passenger, together with his regular railroad ticket, and the other two are retained by the agent. Just before the train leaves a record is made of all the unoccupied berths or staterooms and this is telegraphed to the agent at the next stopping place, who is thus informed of the accommodations at his disposal for passengers from that point. After the train leaves, he repeats this operation and in this way an exact record is on hand at every office before the arrival of the train of the spare seats or berths.

Parlor Car Bureau of the New York, New Haven and Hartford Railroad, Grand Central Station, New York. Pigeon holes contain charts for parlor cars for every day in the week.

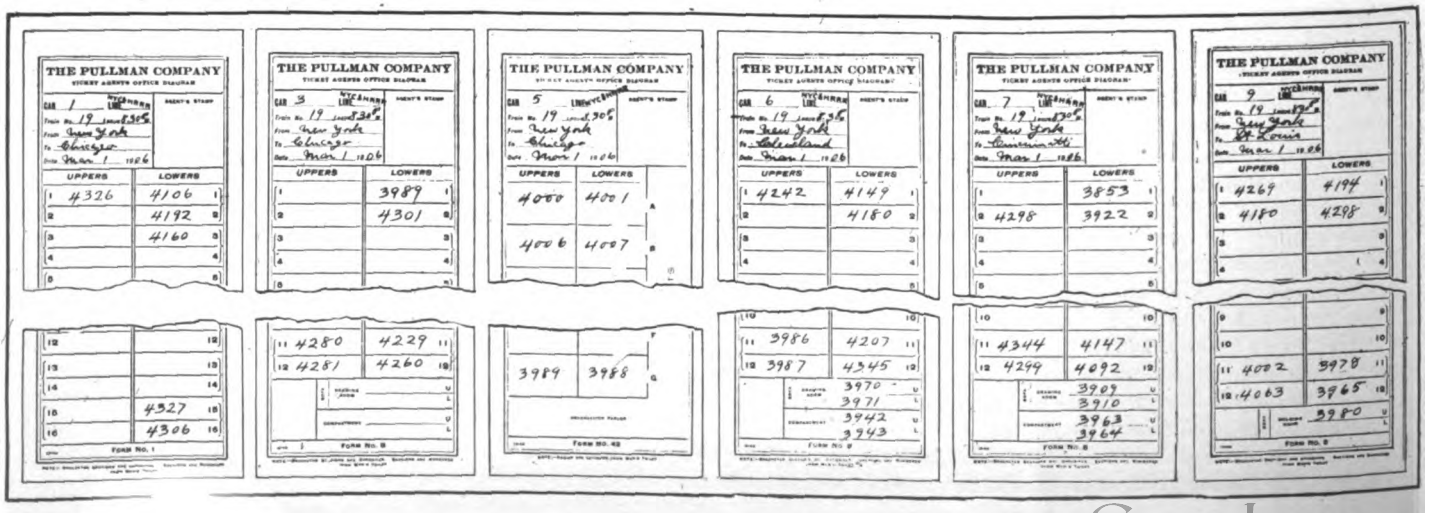
At intermediate points along the line, where the traffic is heavy enough, ticket agents are given reserved space for their disposal so that a passenger does not have to wait till the last minute to purchase his Pullman reservation. Before the train leaves the terminal station all the charts are given to the Pullman conductor and he uses them to check off the passengers. Upon the arrival of the train at its destination these checks are turned in to the company to be kept as a record.

The New York Central Railroad runs each day twenty-four trains to which are attached Pullman cars. Of these the Twentieth Century Limited has accommodations for sixty-two passengers, there being only three cars. So great is the traffic, however, that it rarely carries less than seventy-five per cent. of its passenger capacity. Over fifty per cent. of the berths on this and the other trains is contracted for by telephone. In round numbers an average of three hundred calls are received daily at the Grand Central Station over the official and exchange wires for information and sale of Pullman reservations. These calls come from every part of New York City and Brooklyn, and as the station is approximately in the centre of population it will be readily understood how absolutely necessary the telephone is. Out of town parties can reserve space by telephone and have it held till within ten minutes of the departure of the train, thus giving them equal facilities with the city passenger.

The New York, New Haven and Hartford Railroad operates its own parlor and sleeping car system, but the method of reservation is similar. A bureau devoted exclusively to this work is situated in the general passenger agent's office and shares the same room with the telephone exchange. Here a young lady is in charge who attends to all the details of the sales which emanate from the ticket office in the station or at the branch offices. The trains of this company while not traveling as long distances as those of the New York Central, have in comparison an equally heavy parlor car traffic. In this case, however, the sale of every ticket depends upon the use of the telephone. For this reason the number of calls received per day is equally as large as that of the New York Central bureau.

It may be interesting to note that the telephone has been used by the New York Central road for over fifteen years in the sale of Pullman tickets. This use dates back to a time when this traffic was not one-fourth of what it is at the present time.

Charts of all Pullman Cars on the Lake Shore Limited, Showing the Method of Inserting Numbers.



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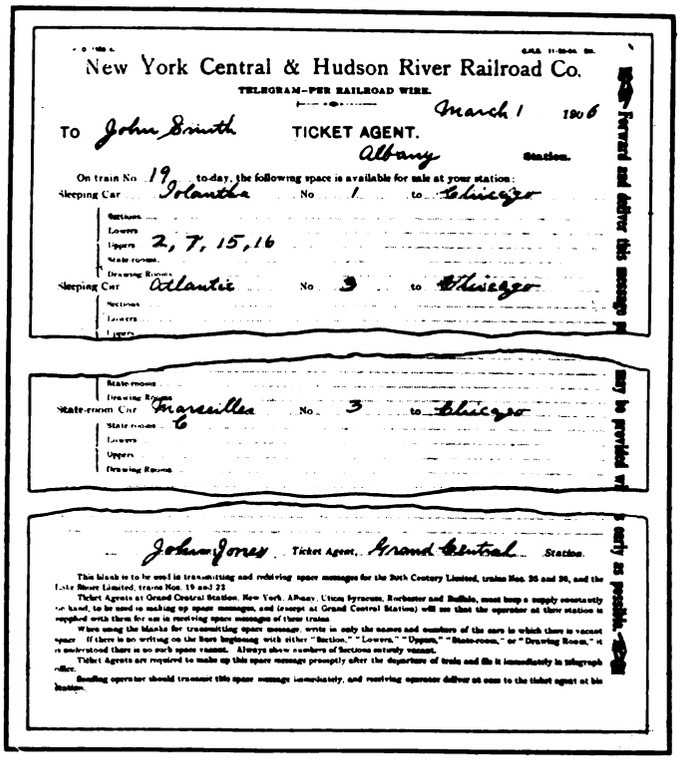
The utilization of the telephone for Pullman car reservation many well be considered to have been the entering wedge for its ultimate adoption as the principal scheme of communication in railroad operation. That it will eventually supplant the telegraph is now a safe prediction. Many of the most important railroads either have extensive telephone service, or are at present engaged in installing it. Just which line was a pioneer in this direction is uncertain, but for years the two railroads previously mentioned in this article have had very comprehensive systems, which, although not used for the actual dispatch of trains, have, nevertheless, proved of inestimable benefit in the transaction of those portions of the business closely allied with the commercial departments of railroad organization.

Besides greatly assisting in the internal affairs of a railroad, the telephone is of much value in the interchange of business with its customers. Every railroad is anxious to secure as much business as possible. When two competing roads cover the same territory keen rivalry exists, and it is safe to say that if one line has adequate telephone connections, it will, by being able to place its agents in immediate and direct communication with the public, secure a larger proportion of the business than the other, which is not so well equipped. It is, therefore, of the greatest importance that the telephone system shall not be a purely local affair, but available for use in the most comprehensive manner for the public service. By this plan the farmer, manufacturer, wholesaler, etc., can talk directly with the official desired, and not be subjected to delays which would otherwise occur.



New York Central & Hudson River Railroad Co.

TELEGRAM—PER RAILROAD WIRE.

March 1 1906

TO John Smith TICKET AGENT. Albany Station.

On train No 19 to-day, the following space is available for sale at your station:

Sleeping Car Yolantha No 1 to Chicago

Uppers 2, 7, 15, 16

Sleeping Car Atlantic No 3 to Chicago

State-room Car Marseilles No 3 to Chicago

John Jones Ticket Agent, Grand Central Station.

Telegraph Form to be Filled in With Information Sent on Ahead of the Train to the Next Stopping Point, to Show Available Space up to Time of Train's Arrival.

The benefits which can be derived from the use of the telephone are well illustrated in the reservation of sleeping car space, but this is only a very small item when the possibility of a comprehensive telephone system are considered, which will not only facilitate the internal business of the road, but also bind it into closer relationship with the public, from which it derives its support.

This has been an important result of the use of the system described in this article. The sleeping car, while it contributes greatly to the relief of the monotony which is usually felt on a long journey, is especially valuable as a time saver. The railroad companies, by the use of many ticket offices, located in the business districts of large cities in such a manner as to completely satisfy the demands of the public for quick service, has reduced the loss of time to the lowest terms. This has been made possible only by the use of the telephone.

Increased Cost of Telephone Service

ORDINARILY, the greater the number of patrons, the cheaper per unit can a public service corporation furnish service to its patrons. With the telephone, however, the rule reverses, and with an increasing list of subscribers the cost per unit for exchange telephone service increases. The reason of this is stated in the bulletin of the Indiana Independent Telephone Association to be due to three conditions, or factors:

First: *Cost of Operating.* The larger the exchange, the greater the value of the service to the individual subscriber on account of the greater number of persons with whom he is placed in telephonic relations. This is not true of other public service, such as gas or water. The service of a gas or water company with 500 patrons is worth just as much to the individual patron as a plant with 5,000. In fact, because of certain difficulties, such as purity and pressure, in furnishing these commodities in large quantities, the service of the smaller plant is often worth more to the individual patron than that of the larger. The value of the service of a telephone system increases, however, in direct proportion to the increase of subscribers, and with this increase in value to the individual patron comes a consequent increase, at a greater ratio, in operating expense. An operator can only answer a certain number of calls, whether in a large or small exchange. Estimating this number at 500 per day, in an exchange of 500 subscribers, and estimating that each subscriber uses his telephone four times a day, four operators will be required. Estimating that an exchange ten times as large, i. e., one of 5,000 subscribers, is worth, to the individual subscriber, twice that of one with 500 subscribers, he will then use his telephone an average of eight times per day, making a total of 40,000 calls daily, which will require eighty operators, each answering 500 calls per day. In the exchange of 500 lines, one operator is required for every 125 subscribers, while in an exchange of 5,000 lines one operator is required for every 62½ subscribers, which doubles the expense of operating per unit line. Theory and experience agree on the above ratios.

Leaving out of consideration all other factors, the following rule on operating has been found true by all exchange managers: *The cost of operating for each telephone in any system increases directly as the value of the service to the individual subscriber increases.*

Second: *Cost of Installation.* Telephone service is individualized. Each subscriber added to an exchange system that gives independent metallic service must have a *separate pair of wires* from his telephone to the answering jack on the switchboard. A gas or water company lays its main in the street—*one main for all residences along the street.* When additional patrons want service, the gas or water company only has to lay a service pipe from the main to the property line, and not from the patron's residence to the central power plant a mile or two distant. The gas and water in the mains is common property for the patrons, and one cubic foot of gas or water will answer the patron just as well as another. Not so with telephone service. Conversations must be individualized. One message will not answer the patron as well as another. Hence service wires must extend from each subscriber's telephone, not to the nearest pole line or cable, but all the way to the exchange. This means that aerial pole lines, heavy enough to take care of an exchange with a certain list of sub-

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scribers, become too small and inadequate when that list increases, causing a consequent increase of wires. The lighter pole line must then be replaced by a heavier one. With the doubling of the subscribers' list, the heavier pole line becomes inadequate, and must be replaced with underground conduits and cables, which are much more expensive than light aerial leads.

The cost of switchboards increases for each unit with the addition of subscribers. A 500-line capacity board will cost, installed, about $5 per line. To add another 100-line section will cost no more per line than the first 500. But to add a hundred additional lines section to a 5,000 multiple board already filled, will cost approximately $50 per line. The unit equipment in a switchboard for subscriber No. 5001 costs ten times that for subscriber No. 601, and telephone engineers have never found the point where the cost per unit does not greatly increase with added capacity.

The question is asked, why does the telephone company not install underground conduits and multiple boards at the start? The answer is at hand. Because a prospective patron is unwilling to pay conduit-constructed, multiple-switchboard prices for service in an exchange of only a few hundred subscribers where such installation is not necessary.

Third: *Increase of General Expense.* Independent telephone companies have not hesitated to accept a maximum limit rate in their franchise. They have aimed to be open and fair with the people whom they served. A vast majority of these franchises were obtained when not only the commodities of life were lower than now, but also when almost all material entering into the general construction was much cheaper. Wages are constantly increasing in all lines of business. The telephone has come to be a business and social necessity. Service that was eminently satisfactory five years ago would not be tolerated by the patron to-day. With this demand for better and dependable service, the telephone company has been compelled to substitute skilled for unskilled help at greatly increased cost. The advent of traction lines, lighting and power systems, on account of inductive disturbances, has compelled telephone companies to substitute individual metallic circuits for grounded and common return systems, which doubles the amount of copper or iron necessary to install a subscriber's line.

With a list of subscribers three and four times as large as that anticipated at the time an exchange was installed, with a service much better and many times as extensive as that promised or contracted for, with the greatly added cost of operation and installation per unit line, due to conditions which no one foresaw and over which the company has no control, it is not unreasonable that telephone companies should have an additional rental per unit line, providing the rate charged under former conditions was reasonable and equitable for the amount and class of service furnished.

Economical Telephone Accounting and Filing Systems

ARTICLE III.—BRANCH EXCHANGE REPORTS, CONTINUED.

*By Charles C. Wilmot, Telephone Accountant.

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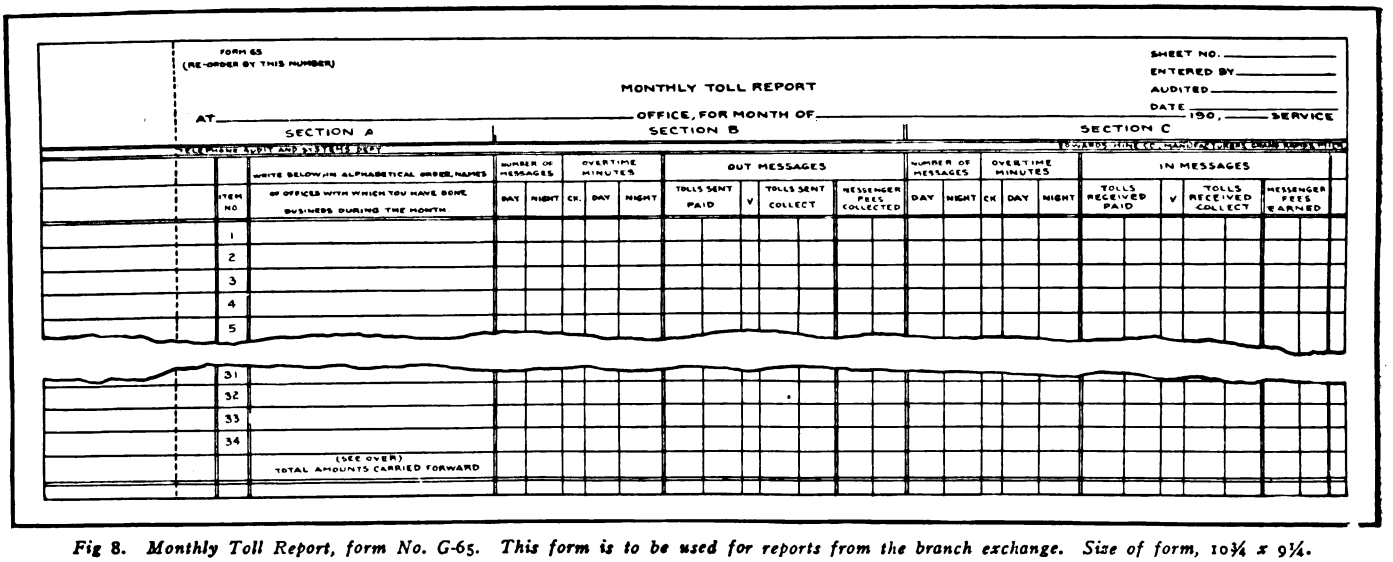
THE forms illustrated and explained in this article were designed and put into actual service in January, 1905, and have stood the practical test of use since that time in many exchanges. A careful comparison of these forms with the very complete report of the Special Tariff Committee of the New York Independent Telephone Association (published in The American Telephone Journal, issue of July 1, 1905) will show with this article.

The "Monthly Toll Report," form No. G-65, is made up from totals shown on form No. G-89. A careful study of the printed headings on this form, makes it self-explanatory. The form is not made in duplicate, but printed in copying ink so that a letter press copy can be taken if desired. Letters A-B-C, etc., on the monthly statement shown on the back of form can be used as a


FORM 65
(RE-ORDER BY THIS NUMBER)

MONTHLY TOLL REPORT

SHEET NO. _____
ENTERED BY _____
AUDITED _____
DATE _____ 190_ SERVICE

AT _____ OFFICE, FOR MONTH OF _____

SECTION A | SECTION B | SECTION C

TELEPHONE SUPPLY AND SYSTEMS DEPT. — EDWARDS & HINE CO., MANUFACTURERS GRAND RAPIDS, MICH.

ITEM NO	WRITE BELOW IN ALPHABETICAL ORDER, NAMES OF OFFICES WITH WHICH YOU HAVE DONE BUSINESS DURING THE MONTH	NUMBER OF MESSAGES		OVERTIME MINUTES			OUT MESSAGES				NUMBER OF MESSAGES		OVERTIME MINUTES			IN MESSAGES			
		DAY	NIGHT	CK.	DAY	NIGHT	TOLLS SENT PAID	V	TOLLS SENT COLLECT	MESSENGER FEES COLLECTED	DAY	NIGHT	CK	DAY	NIGHT	TOLLS RECEIVED PAID	V	TOLLS RECEIVED COLLECT	MESSENGER FEES EARNED
1																			
2																			
3																			
4																			
5																			
31																			
32																			
33																			
34																			
	(SEE OVER) TOTAL AMOUNTS CARRIED FORWARD																		

Fig 8. Monthly Toll Report, form No. G-65. This form is to be used for reports from the branch exchange. Size of form, 10¾ x 9¼.

that all the necessary details therein mentioned are fully provided for. A reprint or copy of the above report should be posted in the office and operating room of every telephone exchange in the country, and the report should be read carefully in connection reference in correspondence, e. g., "Your item A, or R, etc., is not correct, etc."

The printed part of this form (in duplicate) is 10¾x9¼ inches when folded, ready to insert the carbon sheet. In a large system using a great many of these reports, the back of the original portion of this form should be "carbonized," doing away with loose

*Editor's Note: Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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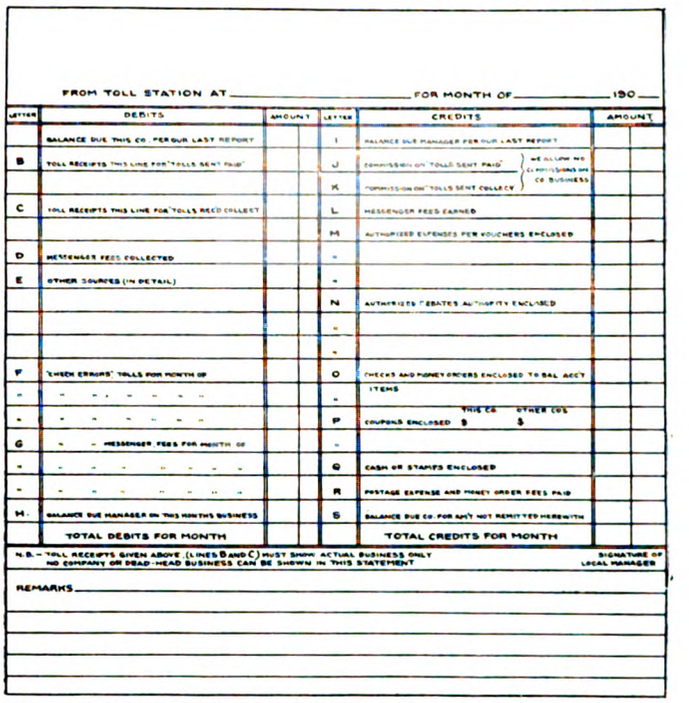
carbon sheets. The form is arranged with a stub, punched for a loose leaf binder, and is to be inserted between tabbed index sheets. With this arrangement they may be quickly and easily referred to for the current month's work. For large exchanges we recommend the vertical system of filing between tabbed guide cards, both for the current month sheets, as also for their permanent system of filing. For exchanges not caring for the duplicate carbon copy the form can be printed flat, three forms on a sheet, put up in perforated pads. Paper stock used should be of a tough but inexpensive quality. A separate duplicate set of toll ledger sheets (Form G-89) must be used for each station with which the reporting station does business, a line being given for each day of the month.

In the "Monthly check report, or Check Ledger," form No. G-89, it is necessary to fill in the blank spaces at the top of each sheet with the name of the originating exchange or station, and the name of the exchange or station from which toll messages have been received or to which messages have been sent. Spaces are provided for the amounts of the day and night rates and the routing of messages. This information is very necessary to a state traffic or clearing house association which handles the interchange business for the state.

The first column must show how many messages were day and how many were night. The second column must show overtime minutes for both day and night messages separately. Great care should be taken in placing all amounts in their proper columns.

In the columns headed "Out messages" and "Toll sent paid" are to be shown the total amounts of all messages paid for at the station making out the report. The "Tolls sent collect" column is provided for the total amounts of all the reversed messages, charges for which are to be collected at the station to which the messages are sent. The amounts in the "Messenger fees collected" column show the total amount charged for messenger service on originating business. The first four columns headed "In messages" are to be used in the same manner as those for "Out messages." In the column headed "Toll received paid" is to be entered the total amount of all messages received but paid for at the forwarding station, while the "Tolls received collect" column is for the total amount of all reversed messages for which payment has been collected at the station at which the report is made out. The total amount of fees earned in getting patrons



FROM TOLL STATION AT _____ FOR MONTH OF _____ 190__

LETTER	DEBITS	AMOUNT	LETTER	CREDITS	AMOUNT
	BALANCE DUE THIS CO. PER OUR LAST REPORT		I	BALANCE DUE MANAGER PER OUR LAST REPORT	
B	TOLL RECEIPTS THIS LINE FOR "TOLLS SENT PAID"		J	COMMISSION ON "TOLLS SENT PAID"	WE ALLOW NO COMMISSIONS ON CO. BUSINESS
			K	COMMISSION ON "TOLLS SENT COLLECT"	
C	TOLL RECEIPTS THIS LINE FOR "TOLLS RECD COLLECT"		L	MESSENGER FEES EARNED	
			M	AUTHORIZED EXPENSES PER VOUCHERS ENCLOSED	
D	MESSENGER FEES COLLECTED		"		
E	OTHER SOURCES (IN DETAIL)		"		
			N	AUTHORIZED REBATES AUTHORITY ENCLOSED	
			"		
			"		
F	"CHECK ERRORS" TOLLS FOR MONTH OF		O	CHECKS AND MONEY ORDERS ENCLOSED TO BAL. ACCT. ITEMS	
"	" " " " " "		"		
"	" " " " " "		P	COUPONS ENCLOSED THIS CO. $ OTHER COS. $	
G	" MESSENGER FEES FOR MONTH OF		"		
"	" " " " " "		Q	CASH OR STAMPS ENCLOSED	
"	" " " " " "		R	POSTAGE EXPENSE AND MONEY ORDER FEES PAID	
H	BALANCE DUE MANAGER ON THIS MONTHS BUSINESS		S	BALANCE DUE CO. FOR ANY NOT REMITTED HEREWITH	
	TOTAL DEBITS FOR MONTH			TOTAL CREDITS FOR MONTH	

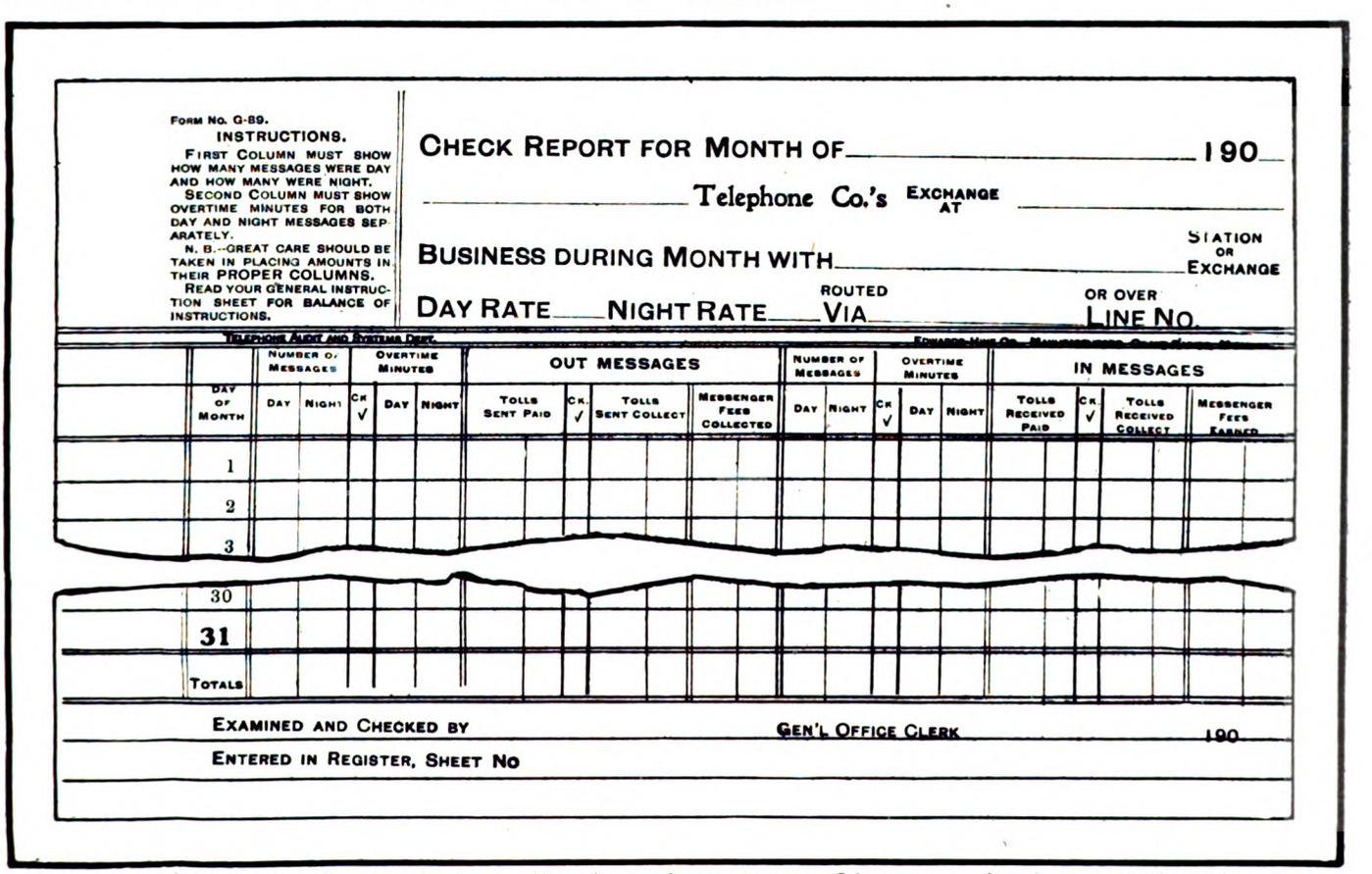
N.B.—TOLL RECEIPTS GIVEN ABOVE (LINES B AND C) MUST SHOW ACTUAL BUSINESS ONLY. NO COMPANY OR DEAD-HEAD BUSINESS CAN BE SHOWN IN THIS STATEMENT. SIGNATURE OF LOCAL MANAGER

REMARKS _____

Fig. 9. This form is printed on the back of the sheet illustrated in Fig. 8. The form is 10¾ x 9¼ inches in size, including stub, which is not shown.

on reversed messages, etc., should be entered in the column for "Messenger fees earned." Reversed messenger fee charges should be prohibited, as it is preferable to collect all such charges at the forwarding station.

Note.—The next article will deal with operator's toll tickets and rental and toll bills.



FORM NO. G-89.

INSTRUCTIONS.

FIRST COLUMN MUST SHOW HOW MANY MESSAGES WERE DAY AND HOW MANY WERE NIGHT.

SECOND COLUMN MUST SHOW OVERTIME MINUTES FOR BOTH DAY AND NIGHT MESSAGES SEPARATELY.

N. B.--GREAT CARE SHOULD BE TAKEN IN PLACING AMOUNTS IN THEIR PROPER COLUMNS.

READ YOUR GENERAL INSTRUCTION SHEET FOR BALANCE OF INSTRUCTIONS.

CHECK REPORT FOR MONTH OF _____ 190__

_____ Telephone Co.'s EXCHANGE AT _____

BUSINESS DURING MONTH WITH _____ STATION OR EXCHANGE

DAY RATE ___ NIGHT RATE ___ ROUTED VIA _____ OR OVER LINE NO. _____

TELEPHONE AUDIT AND SYSTEMS DEPT. FORWARD HERE OR MANAGER'S CHECK [illegible]

DAY OF MONTH	NUMBER OF MESSAGES: DAY	NIGHT	OVERTIME MINUTES: CK ✓	DAY	NIGHT	OUT MESSAGES: TOLLS SENT PAID	CK. ✓	TOLLS SENT COLLECT	MESSENGER FEES COLLECTED	NUMBER OF MESSAGES: DAY	NIGHT	OVERTIME MINUTES: CK ✓	DAY	NIGHT	IN MESSAGES: TOLLS RECEIVED PAID	CK ✓	TOLLS RECEIVED COLLECT	MESSENGER FEES EARNED
1																		
2																		
3																		
30																		
31																		
TOTALS																		

EXAMINED AND CHECKED BY _____ GEN'L OFFICE CLERK _____ 190__

ENTERED IN REGISTER, SHEET NO _____

Fig. 10. Monthly check report, for accounting for month's business at branch exchange. Columns are provided for the separation of items in accordance with the classification of tickets.

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OFFICIAL BULLETIN NUMBER EIGHT OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

MAPS:

We have begun toll line maps for Nebraska, Kansas, Kentucky and Minnesota, making thirteen States to date for which maps are being prepared.

If you have not already done so—please SEND US THAT MAP OF YOUR LINES.

COMMITTEES:

The following Committees have been appointed. Communications in regard to the work they will take up are invited and can be sent addressed to the Chairmen of the respective committees in care of this office.

Standard Forms of Accounting: Chas. F. Bender, Chairman, Pittsburg, Pa.; C. J. Myers, Kansas City, Mo.; Geo. T. Hewes, Des Moines, Ia.; R. E. Mattison, Lincoln, Neb.; H. W. Spooner, Minneapolis, Minn. Standardization of Equipment: M. H. Clapp, Chairman, St. Louis, Mo.; W. C. Polk, Birmingham, Ala.; Edmund Land, Grand Rapids, Mich.; O. F. French, Cleveland, Ohio; J. W. Kelly, Jr., Philadelphia, Pa. Standard Operating Rules and Regulations: J. B. Casey, Chairman, St. Louis, Mo.; W. C. Handlan, Wheeling, W. Va.; L. R. Herrick, Freeport, Ill.

STATISTICS WANTED:

We should like to hear from the companies operating rural telephone systems in regard to the increased value of real estate in country districts due to the introduction of the telephone. It is a commonly recognized fact that such increase in value invariably follows the completion of rural telephone lines, and we think the compilation and publication of statistics with reference to this will be of interest and value to all Independent operators.

SUPPLY DEPARTMENT:

Judged by results, the Independent telephone people appreciate the efforts of this department to thoroughly introduce the "Official Shield." Just now we are making a special endeavor to have all independent companies, who are not at present doing so, display the standard toll sign at exchanges and toll stations. Will you co-operate by seeing that your company gives us the proper amount of support? An illustrated catalog will be sent on request.

KEYSTONE COMPANY OF PHILADELPHIA AIDS REVIVALISTS.

IN Philadelphia great interest is being aroused by the work of the revivalists Torrey and Alexander. Thousands have found it impossible to crowd into the armory to hear the services. Having come from far and near to hear the revival leaders, they were not at all satisfied with the inducements made them to attend meetings in nearby churches where the preaching and singing were conducted by local mission workers. The Keystone Company has arranged to solve the difficulty by the transmission over its wires of the proceedings at the Armory. When Dr. Torrey speaks and Mr. Alexander's choir of 600 sings they may be heard by every subscriber to the system of the Keystone Telephone Company.

Connections have been made with the telephone company's hospital outfits for an extension of the service to the beds of the sick, and in many of these institutions the revival spirit will cheer the suffering. All who desire to take advantage of the unique arrangements have only to ask for telephone connection with the Armory.

The system was installed under the supervision of John W. Kelly, Jr., who has secured most successful results.

SEWARD COUNTY, NEBRASKA, SERVED BY RAPIDLY GROWING INDEPENDENT COMPANY.

SINCE the two companies originally organized to give independent telephone service in Seward County, Neb., were consolidated under the name of the Seward County Telephone Company it has to-day the entire south and west part of the county covered with its wires. A splendid exchange has been erected in Seward, and the company is now reaching out for business in all directions. It has recently gone into Germantown, and a large number of patrons have been secured there and in the surrounding country. An Independent line has been built in the northwest part of the county with headquarters at Staplehurst, and while it has a separate organization from the Seward County company, they are both connected with the Seward exchange and a patron of one in any part of the county can talk with a patron of the other. The total number of telephones now in use is 1,083, while orders have been taken for 116 more, which will be installed as soon as possible. These will carry the total number up to 1,199. The exchange at Seward has been in operation a little over six months, and the total number of subscribers is 198. Two farm lines are being built out of Seward, and others are likely to be constructed within a short time. Seven exchanges are maintained in the county at the present time, including the one at Seward, the others being at Staplehurst, Tamora, Beaver Crossing, Utica, Germantown and Milford.

The company is capitalized at $50,000, and at the close of the past year $28,650 of the stock had been sold. Since then, however, the amount sold has been increased to nearly $40,000. Every share of stock is owned by Seward county people or people living across the line in other counties but who are patrons of the system. According to the annual statement published the first of the year the company has invested in lines constructed over the county and supplies the sum of $32,779.70, and in addition thereto the Seward plant is carried at $12,593.62, which is the amount it cost. Last year the company earned dividends on the capital stock to the amount of 16 per cent., of which 4 per cent. was placed in the maintenance fund, and 12 per cent. paid to the stockholders. The following are the officers of the company, all of whom reside at Beaver Crossing:

President, Jacob Geis; vice-president, J. P. Mayhew; secretary, J. H. Ritchie; treasurer, L. G. Gake. The board of directors is composed as follows: E. H. Strayer, Milford; O. D. Thygeson, Utica, and J. J. Thomas, Seward.

INDIANA INDEPENDENTS BLOCK MOVEMENT OF THE BELL BY REFUSING SERVICE TO TOWNS CONNECTED WITH BELL LINES.

THE Independent Telephone Companies of Northern Indiana have successfully blocked a move made by the Bell Company to establish sublicense toll stations through independent exchanges. The step was taken during the past week in Ligonier, Leesburg, Milford and other towns in Northern Indiana. The Independent Companies ordered the Bell connection cut off. The order was emphasized by a declaration that refusal would mean that the Independent Companies would cease to give the towns service. It is stated that the connections have been cut. It is quite certain that the sublicense plan of the Bell Company will be effectively headed off in Indiana through this movement.

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QUERIES

CABLING LAYOUT.—(661.)

Will you kindly explain the method of arranging cabling for a standard Bell line circuit? R. Z.

A standard Bell line circuit employs an answering jack associated with calling in lamps at one part of the switchboard, and the line is also connected to the multiple jacks located in the upper part of the switchboard sections. The line signal is operated by relays, which are located upon the relay rack.

The line enters from the outside of the building through the cable, and is connected to terminals upon the main distributing frame. Two types of standard frame are used. In one type the outside cable is connected to the arresters, mounted vertically upon one side of the frame, and the line passes through heat coils in these arresters, and from the inner terminals cross wiring in twisted pairs is extended to terminals on the horizontal side. From these terminals the line is continued through a cable made up of twenty twisted pairs of wires, which extends to the horizontal side of the intermediate distributing frame. In the main frame of the other class the cables from the outside are terminated upon strips on the horizontal side of the frame, from which cross wiring extends to the arresters. The cable to the intermediate distributing frame is connected to the other terminals of the arresters, the line passing through the heat coils as before.

At the intermediate distributing frame on the horizontal side are provided terminal strips containing twenty sets of three punchings each. Two of the punchings of each set are connected to a pair of wires in the cable from the main distributing frame. It will be seen that one entire terminal strip, therefore, corresponds to a single cable from the main frame. From the two line terminals each pair of wires is extended in another cable to the multiple jacks on the switchboard. These cables are made up of twenty pairs and twenty single wires, the pairs being connected to the tip and ring of each jack, and the single wires connected to the sleeve of each jack, and the third terminal of each set as referred to above. It will thus be seen that upon the horizontal side the terminal strips have connected to them two sets of cables, those from the main frame and those to the multiples, both of which are arranged to run to the lower halves of the blocks. The punchings extend through the blocks, and from the top cross wiring is run to the terminal strips which

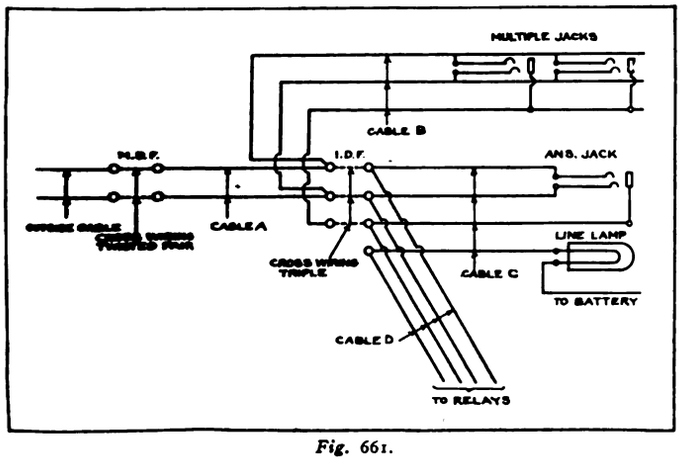

Fig. 661.

are mounted upon the vertical side of the frame. Three wires twisted up together are used for each line. Each block on the vertical side is provided with 20 sets of four terminals each. Three of the terminals are for the tip, ring and sleeve connections of the answering jack, and the fourth is for the line lamp. One cable, containing 40 pairs of wires, is run from each terminal strip to the switchboard, where it is divided in the answering jack space, taking two strips of answering jacks and the two associated strips of line lamps. The line lamp wire receives positive battery through a contact of the line relay, and the cir-

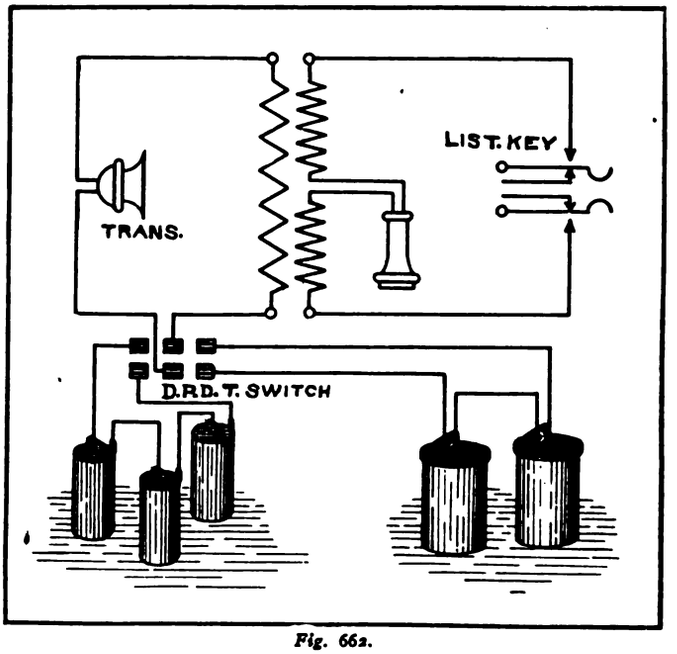

Fig. 662.

cuit through the lamp to negative battery is completed by means of a common wire run directly to the lamps in the switchboard from the fuse board.

The relay rack, which is usually set parallel to and immediately opposite the vertical side of the intermediate distributing frame, has mounted upon it one relay for each answering jack. These are connected to the line circuit at the terminal blocks on the vertical side of the frame by means of a cable made up of 40 twisted pairs of wires, there being four wires for each line.

In Fig. 661 this arrangement, as carried out for a single line, is shown diagrammatically. The cables A, B, C and D are used to carry the line from the main frame to the intermediate frame, intermediate to multiple jacks, vertical side of the intermediate frame to answering jacks and the vertical side of the frame to relays, respectively.

AUXILIARY BATTERIES.—(662.)

We have a small exchange located at some distance from headquarters and sometimes we are troubled by the batteries giving poor service when it is inconvenient to send a man to change them. Can you tell us of any method by which the operator can tell when the batteries are nearly exhausted, in order that we may avoid having the service give out at unexpected times? L. F.

A battery gauge of some good type may be used to determine the condition of the cells from time to time. This, however, is not a sure protection, and we would suggest that you have two sets of batteries, so arranged that either may be used upon the operator's transmitter circuit. This can be readily brought about by carrying the battery wires from the primary circuit of the operator's set to the middle points of a double pole, double throw, baby knife switch. The regular set of batteries may then be wired to one pair of terminals, and the opposite pair should be connected to three dry cells wired in series. Whenever the wet batteries give out, the operator may cut in the others by simply throwing the switch, and the defective batteries may be renewed when it is convenient for the inspector to visit the station.

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THE EDITOR'S PAGE

PROPERTY VALUES AND THE RURAL TELEPHONE.

THE eighth bulletin of the National-Interstate Telephone Association contains a request for statistics showing the effect of rural telephone lines upon the value of real estate. It is well known that this effect has been to greatly increase the worth of the land located outside of local centres of population.

With the exception of methods of increasing productiveness, there is nothing which will operate so quickly to raise the value of property in a rural community as the establishment of additional facilities for communication. For a long time it was an axiom that prosperity followed the railroad. With the introduction of electric lines, also, the prosperity of the country surrounding these systems was immensely increased.

The extra value which has been thus added to the property is due, in a large measure, to the increased ease with which residents may learn the condition of the market. The industry of these communities, to a large extent, consists in the raising of food products, which are especially subject to fluctuations in price. On account of their perishable nature and bulk, they cannot be retained at distributing centres to await a favorable opportunity to sell, and, in order to obtain the best prices their producers must get their wares into the market and sell them immediately after the fact of a temporary rise in value is learned.

With proper methods of transportation a farmer can visit the nearest local market frequently and learn within a short time of any change in conditions which it is to his advantage to know. The telephone, however, enables him to be informed of a special demand instantly, and it only remains for him to get his goods transported, and thus more than half the time required to dispose of his goods is saved.

In addition to the direct money gain which comes from the advantage in selling the property, there is usually a distinct saving possible in the buying of goods. Purchases may be made over the telephone line, and time which would be lost in a visit to the place where the goods are bought can be profitably expended at home in directing operations that will be more productive.

There is no industry which is more dependent for success upon the earliest knowledge of weather changes than that of agriculture. The rural line enables the farmer to receive the earliest reports of probable changes. In fact, a regular weather service is frequently given by warning the subscribers by a special ring at a pre-determined hour of the day, and reading the weather forecast to all who come in on the line and listen. This service very often enables a saving from frost and other disastrous conditions to be made, which vastly increases the total value of harvests in certain regions.

In addition to these things, which have a direct effect upon money values, the telephone contributes to the greatest extent to the features which make life in isolated regions less lonely. In the evening the telephone line is frequently used for social diversions which bring whole communities together, and its value in this respect cannot be overestimated.

As a means of insurance against sudden danger, as has been shown in instances where it has quickly called members of a scattered community together to extinguish fires, it again operates directly to save property, and so adds to the accumulated wealth of the people whom it serves.

While the general effect of a rural telephone system in increasing values of property may be rather widely recognized, it is very important that statistics should be at hand which will give definite information. The use of these statistics will obviously enable telephone managers to use a very powerful argument when endeavoring to secure additional subscribers to such systems. The benefit to the people offered by the presence of the line should be a useful argument in securing rights of way when there is a tendency to oppose these, or charge for them at excessive prices. In financing a company such figures as the National-Interstate Asociation proposes to gather should furnish very good arguments to present to prospective stockholders in the region to be tapped by the system. Definite figures, from known sources, are in all cases much more reliable and more convincing than estimates.

The work of gathering these figures is so great a task that it can only be successfully undertaken by a body able to collect from all available sources. The development of the rural systems has received a good start, and every effort should be made to push it forward as rapidly as possible. The plan under discussion offers to every telephone manager an opportunity to aid this movement materially, and, incidentally, to increase his knowledge of local affairs in a way that will be directly and immediately beneficial to himself. It is to be hoped that no time will be lost in giving all possible assistance to this undertaking.

THE TELEPHONE AND THE RAILROAD.

THE way in which modern methods of communication fit together to form a system adapted to serve the public interests to the fullest possible extent is very clearly illustrated by the special uses of the telephone service which have been adopted by the railroads. As described in another part of this issue, a traveler takes the first step in the accomplishment of a journey by the use of the telephone. From the time he reaches the station he is using a system in which the telephone contributes in almost innumerable ways to aid him to reach his destination quickly and safely.

It goes without saying that a large part of the administration of a railroad system is done over telephone lines, as is the case with any other business. More recently the use of the instrument has been widely extended to take in many classes of information used in the handling of trains, which have been previously transmitted by telegraph. It has been found that the telephone is thoroughly reliable, and possesses the immense advantage which comes from the fact that the atendance of a specially trained person is not required. If an office is called, it is not necessary that the regular operator should be present; anyone who is there may take the message.

The service is being even further extended so that a train on a siding, or even one delayed between two stations, may attach an instrument to the wires running alongside the track, and communicate with headquarters. In this manner all danger resulting from uncertainty may be eliminated. A conductor may speak to the dispatcher's office at any time.

The usefulness of affording these facilities for direct communication between trains and offices has proved to be so great that the system is being extended rapidly to almost all the railways in the country. In many minor ways this system of communication is used to secure more complete and efficient control of the traffic. On at least one railroad experiments are even being made with instruments for the connection of the engine driver's cab with the cars of the train, in order that the conductor may carry on a conversation with the engineer.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

REVERSAL OF ORDER DISSOLVING TEMPORARY INJUNCTION SECURED BY THE VILLAGE OF CARTHAGE, N. Y.

THE following letter has been received giving additional information about the temporary injunction secured by the village of Carthage against the Central New York Telephone & Telegraph Company restraining the defendant from setting poles in the village and attaching to any pole set since January 1, last, any cross arms or wires. We are grateful for the information.

Under your items on page 61 in the issue of THE AMERICAN TELEPHONE JOURNAL dated Jan. 27, I note an item relating to the case of the village of Carthage against the Central New York Telephone and Telegraph Company, and for your information I beg to say that this injunction was dissolved by Judge Andrews on Nov. 10, 1905. The case was appealed by the village of Carthage to the Supreme Court, Fourth Appellate Division, and Judge Andrews' decision was reversed, which restored the injunction, and the case will now be tried upon its merits. This decision of the Supreme Court was made Jan. 9. The decision of Justice Andrews in dissolving the injunction was a great surprise to the legal profession in this vicinity, and it did not take the Supreme Court long to restore the injunction.

The circumstances of the case were that the local or Independent company had just completed over-head construction one year ago, the local telephone company occupying one side of the streets and the Electric Light Company the opposite side. The village did not care to have a third set of poles, and as the Independent company had a franchise and the Bell company did not, they asked the Bell company to place its wires in conduits in the principal streets. This they refused to do, on the ground that the Independent company had not been required to do the same thing. The village did not see its way clear to ask the Independent company to reconstruct its system, after it had just been completed; therefore, they insisted that the Bell company should put wires in conduits.

At the time the franchise was applied for by the Bell company it had very few telephones in the village of Carthage, probably not more than twelve or fifteen, while the Independent company had over three hundred and furnished most of the business. It remains now to be seen whether the village has any right to say whether the Bell system shall be constructed underground, or a third set of poles be placed in the streets. In the meantime the injunction is in effect.

INDEPENDENTS WIN INFRINGEMENT SUIT INVOLVING SCRIBNER AND McBERTY PATENTS.

IN the case of the Western Electric Company against the Rochester (N. Y.) Telephone Company and others, the United States Circuit Court of Appeals for the Second Circuit has affirmed the decision of the court below in favor of the defendants. The Scribner and McBerty patent, on which suit was brought, was considered one of the most valuable owned by the Bell interests, and the Independents are correspondingly elated. While the defendant was the Rochester Telephone Company, it was well known that the Stromberg-Carlson Telephone Manufacturing Company maintained the defense.

The case came to the Court of Appeals from a decree of the Circuit Court for the Western district of New York, dismissing a bill of complaint in a suit in equity for alleged infringement of United States patent 559,411, granted May 5, 1896, to complainant as assignee of Charles E. Scribner and Frank R. McBerty for "improvements in apparatus for telephone switchboard." The opinion of the Circuit Court is reported in 132 F., 814.

The court said that while it did not find in any single prior patent a distinct anticipation, it fully concurred in the conclusion of the lower court that the device of the patent "was a mere improvement without involving the exercise of inventive faculty." The court further said that there was a wide difference and an extended controversy between the experts for the respective sides as to opinions, theories and deductions, but that as to the facts which establish the prior art, there is really no conflict, nor indeed, any ground for conflict since they were set forth in the earlier patents which were put in evidence. At the close of the record one of the patentees finally stated the improvement of the patent to be the devising of a "system of supervisory signals in which the interruption of the talking current in the line circuit is caused to apply the current or power for displaying the positive supervisory signal, which current or power is later withdrawn when the plug is withdrawn from the jack, permitting the signal to disappear." This "system," said the court, is brought about by a rearrangement of old parts, and in the literature of the art, these parts had already been brought together in such a variety of ways, and there have been so many substitutions of one device for another, so many methods shown of controlling one current by another and of displaying and obscuring signals, such a transposition of parts and shifting of currents, that it seemed entirely clear that the rearrangement of the patentees, clever though it may have been, and in its details perhaps novel, was nevertheless one of thosse minor improvements which was easily within the ordinary skill of the telephone engineer. The court added: "If the expert who is called to testify in such cases would only appreciate that he is not addressing electrical engineers, but laymen; and if, when undertaking to describe what some particular patent showed to a man skilled in the art, he would take the specifications and drawings of the patent as his text instead of some conventional paraphrases of his own devising with its lettering entirely changed, he would materially lighten the labors of the court." To be reported in Federal Reporter.

FURNISHING MARKET QUOTATIONS.

ON the relation of the Hammond Elevator Company, the State of Indiana applied for a writ of mandamus against the Western Union Telegraph Company to compel it to sell and deliver to relator the continuous market quotations of the Chicago Board of Trade. From a judgment granting the application, the telegraph company appealed and judgment was reversed by the Supreme Court of Indiana. The court held that where a telegraph company, in the exercise of its charter rights and in connection with its other business, has been engaged in buying continuous quotations of prices of products of the board of trade, and selling the same at a fixed price to such persons as desired them, for such a length of time as to make such quotations necessary to the successful conduct of business in such products, the quotations and the system of supplying them have become impressed with the public interest, so that, so long as the company continues in such business, it must supply those desiring the quotations on equal terms. The answer of the company alleged that the relator was, at the institution of the suit, engaged in prolonging such quotations and using them in conducting a bucket shop and that relator desired the quotations for the purpose of a bucket shop. This answer was held a good defense to the application for mandamus. The telegraph company had agreed with the board of trade not to deliver the market quotations to the board unless the applicant would agree not to use them for the purpose of conducting a bucket shop. The relator would not so agree and this was held a good defense. Western Union Telegraph Company v. State 76 N. E.; 100.

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IN THE OPERATING FIELD

GOVERNMENT OF MANITOBA ACTIVELY INTERESTED IN SECURING INDEPENDENT TELEPHONE SERVICE.

THE formation of an Independent telephone company of mammoth proportions in Manitoba is now being considered by the local government. Several months ago petitions began to come in from the smaller towns of the province urging the government to secure the public ownership of all telephones in use in the province. When the first petition arrived Hon. Robert Rogers, minister of public works announced that he had under consideration just such a scheme. At the present session of the legislature the question was taken up and the house decided almost unanimously in favor of government control of telephone rates. Experts gave their evidence before a special telephone committee with the result that it was learned that a company could be formed and by charging considerably less than half the rates in force by the Bell company could make a very handsome return on money invested. At the present time practically half the members of the local legislature have left for the south to inspect various Independent companies in operation. It is reported that the government will offer a company every inducement to operate by guaranteeing its bonds, etc. The government plan is to finance some Independent company that will agree to government control of rates and will equip the cities, villages and towns of Manitoba with telephone systems and will also build trunk and rural lines wherever necessary. A prominent member of the government stated a few days ago that the Independent company of Manitoba, as it will be called, will be in operation within a year.

MEETING OF THE IOWA ASSOCIATION TO BE HELD AT DES MOINES.

THE next meeting of the Iowa Telephone Association will be held at the Chamberlain Hotel, Des Moines, on March 13, 14 and 15. The program will be announced later. Matters of wide general interest will be discussed, and Independent telephone men throughout the State will not fail to receive substantial benefits from attending.

LONG DISTANCE COMPANY PROPOSED IN ARKANSAS.

A MOVEMENT for an Independent long distance telephone company to extend all over Arkansas and through Texas, Louisiana and Tennessee has been started at a meeting held at Little Rock by the Independent telephone men. At the conclusion of the business it was announced that a system of Independent telephones covering 1,500 or 2,000 miles in Arkansas, and representing an expenditure of about $750,000, would probably be in operation within a year. If the plans of the Independent telephone men mature, cheaper telephone rates and improvements of great advantage to business men in the cities will result. The scheme is now being pushed by the Independent men to form a compact organization of Independent companies distributed over Arkansas, Texas, Louisiana and Tennessee. It is then planned to connect all of these companies, beginning first in Arkansas, then going to Texas, and finally into Louisiana with Memphis and Little Rock as central points. With every city of any importance in these states banded together by a long distance Independent organization, it is declared that an Independent system covering the entire South will soon follow. The first move made at the meeting was to form a temporary organization. This consisted of Dr. R. M. Drummond, of Russellville, Ark., as chairman, and John B. King, of Texarkana, as secretary. Among the Independent companies represented at the meeting were: the Russellville Telephone Company; Atkins Telephone Company; London Telephone Company; Dover Telephone Company; Citizens' Telephone Company, of Paris; Branch Telephone Company; Franklin Telephone Company, of Charleston; Home Telephone Company, Ozark; Western Telephone Company, Ozark; Lawrence County Telephone Company, Walnut Ridge; Pine Bluff Telephone Company; Memphis Telephone Company, Memphis, Tenn.; Jonesboro Telephone Company; Paragould Telephone Company; Batesville Telephone Company; Little Rock Telephone Company; Commercial Telephone Company; Pan Telephone Company, Ft. Smith; Texarkana Telephone Company; Long Distance Telephone Company, Texarkana.

CUMBERLAND TELEPHONE COMPANY FAILS TO SECURE ENDORSEMENT OF BUSINESS MEN IN KENTUCKY.

AT an open meeting of the Commercial Club at Carrollton, Ky., held on January 30th, representatives of the Cumberland (Bell) Telephone Company appeared and asked for an endorsement of an application for a franchise. After a long and thorough discussion of the question the club unanimously rejected the Bell company's proposition.

MEMBERS OF THE NINTH DISTRICT OF THE INDIANA INDEPENDENT TELEPHONE ASSOCIATION HOLD QUARTERLY MEETING.

THE third quarterly meeting of the Ninth District of the Indiana Independent Telephone Association was held at Evansville on February 1st. The meeting was called to order by W. D. Curl, vice-president of the district. Twenty-six companies out of a total of 27 in the district were represented. These companies reported nearly 15,000 telephones in operation in the district at this time. Following the disposition of some routine business, Allen Gray, of Evansville, in greeting and welcoming the members to the city, took occasion to review the local situation. Mr. Gray said conditions were never better; that the Independent companies are all operating on a safe and paying basis and the prospects of getting a foothold in Evansville are so bright as to make it almost a certainty. Mr. Gray's review of the situation was productive of a number of inquiries and resulted in the adoption of a memorial to the mayor and board of public works asking that no franchise be granted to an Independent company to operate in Evansville unless it has not only the financial ability to establish an up-to-date modern telephone system in Evansville, but one also able to make connection with the vast Independent systems surrounding Evansville and through Indiana and the central states. It is understood that the Pocket Long-Distance Telephone Company, of which Mr. Gray is president, will be the company to make the application for an opening in Evansville.

"Service Between Exchanges" was the subject of an interesting paper read by W. H. Moore, manager of the Knox County Home Telephone Company at Vincennes. Mr. Moore's paper provoked a generous discussion and a number of new ideas advanced will be put to the test at once.

The attendance was the best and the interest manifested was the most gratifying in the history of the association. The next meeting will be held at Huntingburg the first week in May.

The following are some of the more prominent telephone men present and the companies they represented: Henry Landgrebe,

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PROVE THEIR SUPERIORITY

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WRITE FOR OUR NEW CATALOGUE **GRAY TELEPHONE PAY STA. CO.** HARTFORD CONN.

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—Telephone exchange in town of three thousand population in Missouri. Toll line connections. Other business demands all my attention. Price, $10,000. Address Box 557, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 557

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—Second-hand telephones. State make of magneto, transmitter, receiver, style of backboard, time telephones have been in service. Address LaFayette Telephone Co., LaFayette, Indiana. 536

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

A SQUARE deal is what we aim to render both employer and employee, when seeking the right man for a place, or the right place for a man. Without effort on your part, without endangering your present position, and without using your employers' time, we hunt up the position for which you are best qualified. Let us find the positon for you. Hapgood's, Suite 511, 309 Broadway, New York City. 464

WANTED—Permanent position in the West or Middle West by competent cable splicer. Address Box 545, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 545

POSITION WANTED—All-round man can take construction or switchboard work. Some experience with cable. Married, sober; 10 years in the work. Factory experience. Address L. F. Tate, R. F. D. No. 5, Attica, Ind. 554

WANTED—Position as manager, superintendent or wire chief. Eleven years' experience; good, all-around telephonist. Can take complete charge of from 1,000 to 2,000 subscribers. Address G. W. J., manager Home Telephone Company, Uhrichsville, Ohio. 547

WANTED—Continued

WANTED—An active partner with some money to put in a good paying telephone business. Owner is forced to take this action because of lack of capital to carry on rapidly expanding business. Address Box 543, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 543

WANTED—Position as manager, wire chief or foreman in exchange of 500 subscribers. Five years of the best practical experience in all branches; $90 per month. Address Box 551, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 551

WANTED—Position as manager. Have had 14 years' experience in all branches of the business from the ground up. Past eight years have managed and superintended construction. Married and temperate. Very best of recommendations. Address M., 2119 A, Cass avenue, St. Louis, Mo. 552

WANTED—Position as superintendent or foreman of telephone manufacturing company. Four years' experience with large telephone company. Address Box 553, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 553

WANTED—Position in Mexico as telephone manager or traveling representative. Am at present manager of an exchange of 1,500 subscribers. I speak German well; also a little Spanish. Address Box 555, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 555

WANTED—Position as manager of Independent telephone company of from 500 to 1,200 subscribers. I am an experienced business man, good on the details of telephone management, and know how to handle the public. Have made modern methods of telephone accounting and operation a specialty. Address Box 556, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 556

SITUATION WANTED—By man (32) with a telephone or electrical company. Good general knowledge and experience in telephony and electricity. Some knowledge of bookkeeping. Address Box 550, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 550

WANTED—Young men not over 22 years of age, preferably high school graduates, to enter apprenticeship course of a large telephone factory where they will be trained to install and operate large modern switchboards. Address, stating age, education and electrical experience, Box 546, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 546

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H. C. Rothert and Phillip Dilly, Huntingburg; W. A. McGregor, Mt. Vernon; R. N. Parrett, Petersburg; F. R. Parrett, Princeton; W. G. Turpin, Bricknell; C. M. Gregor, Loogootee; M. G. O'Neal, Monroe City; W. H. Moore, Vincennes; W. H. Wallace, Washington; C. S. Norton, Indianapolis. The following companies were represented: Daviess County Home Telephone Company, Washington; Interstate Telephone Company, Odon; Plainville Telephone Company, Plainville; Black Snake Telephone Company; Crystal & Hillman Telephone Company; Dubois County Home Telephone Company, Huntingburg; Holland Telephone Company, Holland; Princeton Telephone Company, Princeton; Hazelton Telephone Company, Hazelton; Bicknell Telephone Company, Bicknell; Knox County Home Telephone Company, Vincennes; Palmyra Independent Telephone Company, Palmyra; Wabash Home Telephone Company, Monroe City; Wheatland Independent Telephone Company, Wheatland; Loogootee Home Telephone Company, Loogootee; Alfordsville Telephone Company, Alfordsville; Pike County Home Telephone Company, Petersburg; Stendal Home Telephone Company, Stendal; Velpen Home Telephone Company, Velpen; Citizens' Telephone Company; Posey County Home Telephone Company, Mt. Vernon; Luce & Ohio Township Telephone Company, Rockport; Cypress Telephone Company, Cypress; Rural Telephone Company, Inglefield; Chandler Telephone Company, Chandler; Elberfield & Millberg Telephone Company, Elberfield.

INDEPENDENT TELEPHONE DEVELOPMENT IN STEPHENSON COUNTY, ILL.

STEPHENSON COUNTY, ILL., has one of the best developed Independent systems in the state. The last issue of the directory of the Stephenson County Telephone system shows a list of twenty-five towns in the county with which it connects by direct lines, besides long distance service with Ogle, Lee, Whiteside, Jo Daviess and Carroll counties in Illinois, and adjoining counties in Iowa and Wisconsin. This service will be greatly augmented in the near future, new toll lines being under construction which will enable patrons to this system to reach a very much larger number of important points in every direction.

The compilation of the directory shows that an exceptional amount of care and forethought has been spent on its composition. Every page carries at the foot some strong, pointed paragraph which draws attention to the advantages and superiority of the service rendered by this company.

The head office of the company is at Freeport, where it has about 1,400 subscribers. Patrons are able to reach nearly 2,000 more in Stephenson County. This company is essentially a home institution, it having amongst its stockholders many of the most prominent men in the county. The officers are Dr. D. C. L. Mease, president; W. A. Hance, vice-president; E. T. Morse, treasurer; L. A. Herrick, secretary and manager.

INDEPENDENT TELEPHONE COMPANIES ORGANIZE AN ASSOCIATION TO AID COMPETITION FOR BUSINESS.

THE Independent telephone companies of Boone County, Ind., have organized the Protective Telephone Association, with headquarters in Thorntown. B. P. Lielle is president and George Lyster secretary. The purposes of the association are to devise plans for mutual protection against designing agents of the Bell company, and to improve the telephone service throughout the county.

MINNESOTA COMPANY REPORTS RAPID EXTENSION OF ITS PLANT.

THE North Star Telephone Company, of Mountain Lake, Minn., has been enjoying an exceptionally prosperous year. A yearly dividend of 10 per cent. was recently paid to its 44 stockholders. During the season of 1905 this company has built 42 miles of new toll line, and strung over 100 miles of No. 12 iron wire for farmer's lines. Fifty-five telephones have been installed in connection with this new construction. On June 1, 1904, the company had 12 farmer's telephones in operation and 76 instruments in the village of Mountain Lake. Now there are 81 instruments connected on farmer's lines, 103 in the village of Mountain Lake and 39 in Butterfield, making a total of 223. In addition to those who already have connections, a considerable number of persons have forwarded applications for service, and are awaiting the construction of new lines, which will be taken up early in the spring. The directors have decided to make important extensions during the coming year. The directors of the company are: S. Balzer, Frank Balzer, J. H. Dickman, C. C. Quiring, J. D. Schroeder, and the officers are: S. Balzer, president; Frank Balzer, vice-president; J. H. Dickman, secretary and treasurer; J. D. Schroeder, manager.

INVALID IN OGDEN HEARS MINSTREL SHOW BY TELEPHONE.

THE installation of special telephone equipment for transmission from a theatre has not as yet been widely put in practice, and the Utah Independent Telephone Company has made a novel application of this comparatively new branch of service. A minstrel show was recently conducted by the Elks, and a prominent member was confined to his home by paralysis. The telephone company installed special apparatus comprising a transmitter, megaphone horn, etc., on the stage, and by connecting this to the line of the absent member made it possible for him to hear every song and joke as readily as did the rest of the audience.

NEW INDEPENDENT COMPANY FOR CRAWFORD COUNTY IN PENNSYLVANIA.

TWO hundred and fifty subscribers have been secured for the new system of the Eastern Crawford Telephone Company. This concern, which was recently organized with a capital of $15,000 will operate in Crawford County. Lines will be built from Meadville to Blooming Valley, Guy's Mills, Townville, Centerville and Spartansburg. All patrons of the new telephone company are to have free service to Meadville and subscribers of the Meadville Telephone Company are to be given free service over the lines of the new company. Construction has already commenced and it is hoped that the work will be finished early in the spring.

The officers of the new company are: President, James R. Andrews; vice-president, W. J. Maddox; secretary, H. M. Dickson; treasurer, C. S. Burwell, and general manager, John H. Wright. The directors are as follows: J. R. Andrews, C. S. Burwell, H. M. Dickson, of Meadville; John H. Wright and W. J. Maddox, of Jamestown, N. Y.; D. C. Smith, of Guy's Mills; W. H. Boss and George E. Marsh, of Townville.

EGG HARBOR, N. J., INDEPENDENT COMPANY IN A PROSPEROUS CONDITION.

BUSINESS men in and around Egg Harbor, N. J., are unanimous in their praise of the service furnished by the Egg Harbor City Telephone Company. This company, which is comparatively new in the field, has by persistent attention to the wants of the public built up an efficient system and obtained numerous subscribers. In its directory for January there is hardly a business house in town that is not listed. New subscribers are being constantly added, so that it was found necessary to reserve space in the directory where the new numbers could be inserted. At the foot of every page there are some convincing remarks relative to the value of telephone service. The officers of the company are Geo. W. Otto, president and manager; Henry Voss, vice president; H. C. Schliehting, secretary, and Lorenz Krein, treasurer.

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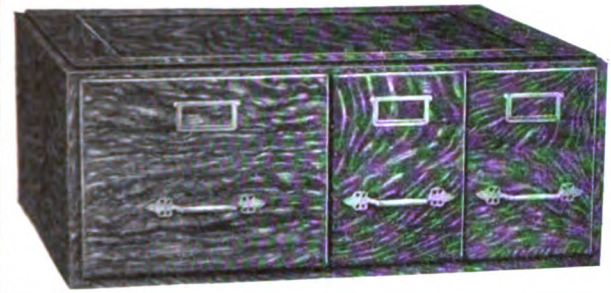

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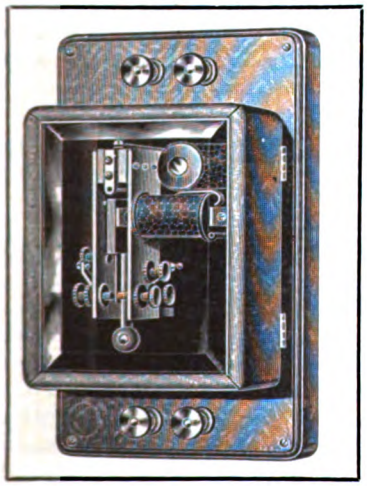

That the Sandwich Pole-Changer, "while its appearance in the cut is strikingly similar to the Illinois," it is a very different and much better instrument. The Sandwich Pole-Changer Company is not the successor of the Illinois Electric Specialty Company. They simply purchased the tangible property of the Illinois Company last June, who had been doing business at a loss for several years, and this is the reason why *their suit went by default.*

The Sandwich Pole-Changer was put on the market by E. C. Hennis, who employed the most careful and able Patent Attorneys to see to it that this instrument was absolutely non-infringing, and it infringes no patent, then or since issued on Pole-Changers.

The Sandwich Pole-Changer Company is strongly backed financially, and is placing these instruments on the market by the hundred each month, and will protect the interests of its customers and users, as well as its own, to the end.

The Sandwich Pole-Changer is an up-to-date instrument made by the best of mechanics, of first class material. Sent on thirty days' free trial, and is in the market to stay.

SANDWICH POLE-CHANGER COMPANY

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TELEPHONE PATENTS

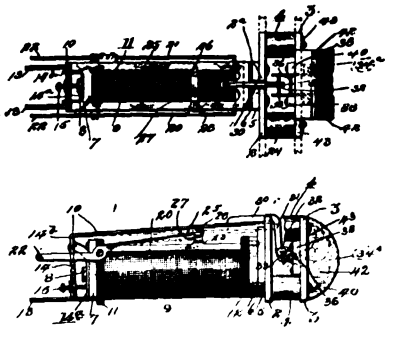
SELECTIVE SYSTEM.

Edward A. Buell, De Kalb, Ill., patents (No. 807,596; dated Dec. 19, 1905; filed Oct. 6, 1904; serial No. 227,463) and assigns to the Selective Signal and Telephone Mfg. Co., Sycamore, Ill., a party line selective system.

The essential feature of this invention is a means whereby the operator is enabled to determine whether any other than the party called is listening on a line. The selective mechanism is provided at the substations, consisting of a prolonged electromagnet which is employed to operate an escapement, which in turn revolves a wheel carrying a contact finger. A relay is so arranged with relation to the contact finger on the wheel that its armature carrying a contact point will be brought into circuit with the finger of the wheel when the latter has been moved around the desired number of points by movements of a key, controlling a battery for operating the prolonged electromagnet. The object of the relay is to momentarily attract its armature to cause its contact finger to become locked with the one on the selective wheel and thus cut-in the telephone circuit. A pole changing key is included in the operator's cord circuit. Moving it in one direction causes current to traverse the line to the substations to step around the selective wheel. Moving it in the opposite direction the prolonged magnet releases the wheel, which is returned to normal by a spring. To determine whether a party other than the desired one is listening on a line an indicator is placed in circuit with a ringing key. The removal of a receiver from a hook opens the circuit of the indicator at that station, and thus the operator, by lifting each one, is immediately apprised of the act by the non-operation of the indicator.

ANNUNCIATOR.

Halvor M. Olsen, Chicago, Ill., patents (No. 811,083; dated January 30, 1906; filed May 16, 1901; serial No. 60,792) and assigns to the American Electric Telephone Company, Chicago, Ill., an annunciator. In this invention means are disclosed for the

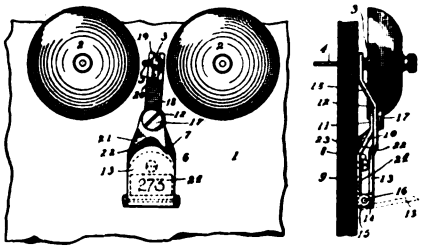


design of an annunciator signal embodying several novel features. Referring to the diagrams, 2 and 3 are plates separated by means of blocks 4. To the plate 2 is attached the coil 9, which carries insulating blocks 11, 12; 6 and 7 are pole pieces of the magnet core 8. Terminal strips 20, 21 are fastened to these blocks, one of which, 20, has a stationary contact 23, the other being provided with a spring strip 25, having a projecting contact member 27. The armature 10 is pivoted at 14b and is provided with a downward extension 14, having an adjusting screw 15 for regulating its movement. At the front end of the armature is an arm 30, which engages the arm 34 of the arc-shaped target 35, pivoted at point 36. A curved cover or case 40 serves to enclose the target 35 and is provided with an opening through which the number can be disclosed.

In normal position the target is depressed. When an electric current traverses the magnetizing coil 9 the armature 10 is attracted, causing the target to be raised into position by means of the extension 30 attached to the lifting lever 34. At the same time the contacts 23 and 27 are closed by means of the extension 30 attached to the lifting lever by reason of the pressure exerted by the armature through the medium of the insulating block 26, thus making provision for an auxiliary alarm circuit.

ANNUNCIATOR.

Walter R. Horning, Cleveland, Ohio, patents (No. 811,063; dated January 30, 1906; filed December 5, 1904; serial No. 235,617) and assigns to the Williams Telephone and Supply Company, Cleveland, Ohio, an annunciator. The object of this



patent is to provide an attachment operated by the movement of the hammer rod of a magneto bell which shall be capable of releasing an annunciator shutter to indicate that a call has been made.

An indicator 6, mounted below the bells, is provided with a base plate or support 7, having an upwardly extending portion 11. To this extension is pivoted a member 12. Its upper portion is slotted to receive the hammer rod of the ringer and the lower part is provided with two prongs beveled on their lower outer surfaces. In normal position either one or the other of these prongs engages the shutter and holds it in position. When the ringer is actuated this pronged member is vibrated and the shutter, under the action of gravity, falls forward between the prongs. It is restored to its vertical position in the usual way, the bevelled surface of the prongs making it easy of accomplishment.

TELEPHONE BRACKET.

Henry F. Foersterling, St. Louis, Mo., patents (No. 806,790; dated December 12, 1905; filed March 6, 1905; serial No. 248,686) a telephone bracket. The essential features of this device consist of means whereby a telephone supported upon a movable arm can always be maintained in a vertical position irrespective of the movement of the support in the arc of a vertical circle. This the inventor accomplishes by means of a pair of parallel bars attached to a base by several joints. The upper ends of the bars are joined together by a vertical plate to which is attached a bar terminating in a clamping device to engage the post of a desk stand. The parallel bars are hinged at both ends so that they can be moved in a vertical arc and the supporting post has a swivel point so that the bracket can be rotated in a horizontal direction. A latch is provided so that the bracket may be retained at any angle in its vertical sweep.

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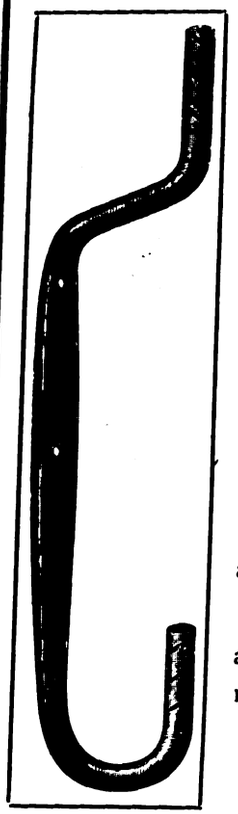
Telephone Line Construction



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They are very sightly, strong, and will last practically forever.

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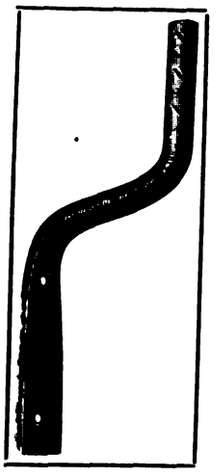
Good Things and Make Them Right



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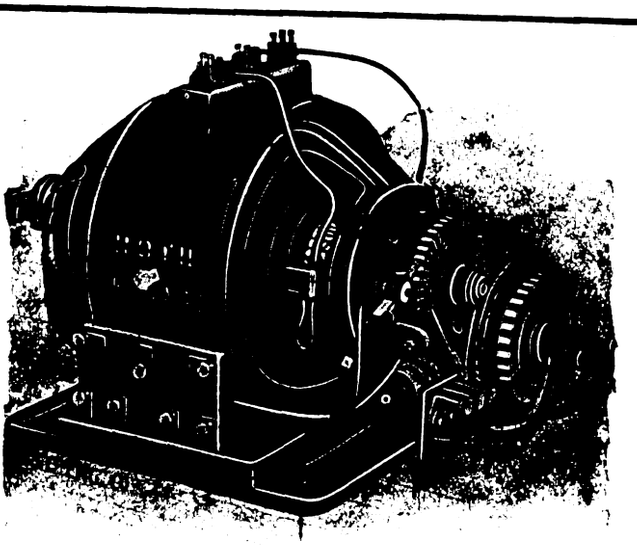

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If so you will need new power apparatus. In selecting it you should be governed by first cost, maintenance cost, efficiency and capacity. Here is where we can help you. We have been making power machinery for telephone exchanges for years—in fact, we are pioneers in this work. We have the most approved tools and we have a system which eliminates every unnecessary cost in manufacture. Because of these facts and our engineering ability you will see more **Roth Generators** and motors in telephone exchanges than all other makes combined. Our knowledge is at your disposal and we can save you time, worry and money.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

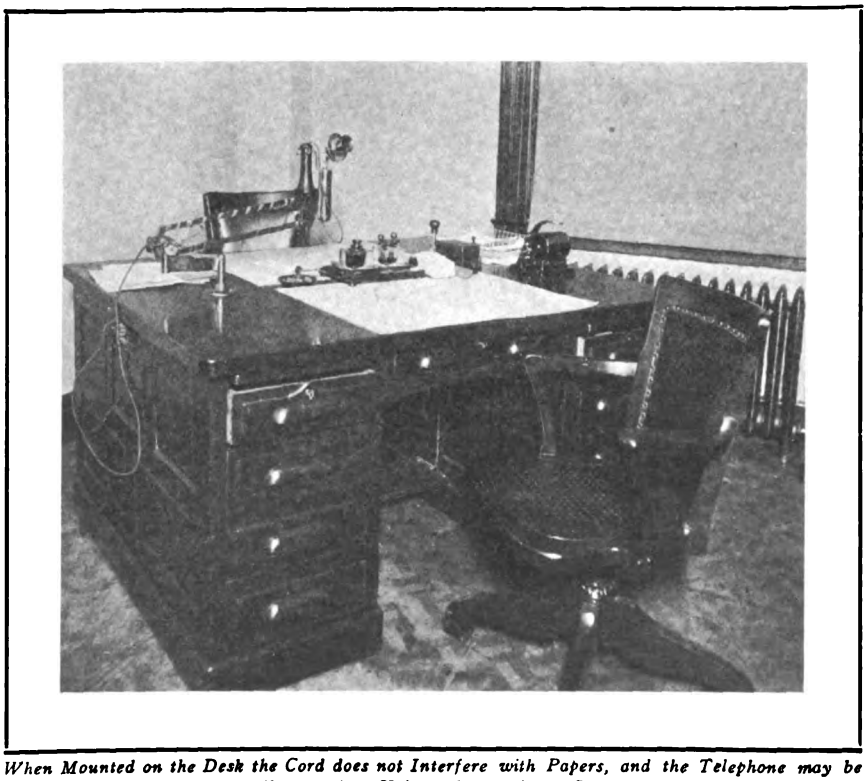
A CONVENIENT AND PRACTICAL TELEPHONE HOLDER.

THE accompanying illustrations represent a telephone swinging arm, etc., all combined in one fixture having a universal joint. The bracket is covered by patents in the name of Charles H. Borden, and owned by the Fox-Borden Manufacturing Company, 110 W. 34th St., New York, of which Charles H. Borden, of Stamford, is general manager, and Farnham Fox, of New Rochelle, is president.

This company's bracket has the following points which make it extremely satisfactory in operation. The cam spring motion gives an absolutely perfect balance of the telephone at any point from a perpendicular down to a considerably lower point than the horizontal. This is made possible by the use of a spring which may have its tension changed to exactly balance the weight of the telephone. This does away with friction of any kind, so that the instrument can be moved by a slight pressure of the hand. The company claims that there is absolutely no bearing surface to wear out, or to require oiling. The best material and finest workmanship are employed in its construction. It is an article designed for the very highest grade of service.

The Telephone Holder May be Mounted Behind the Desk, and When Not in Use Folds Back Against the Wall.

The bracket has many different motions, by means of which the telephones can be brought to any position desired by the user, so that he may speak into the transmitter when standing up or sitting down, or even to a lower position as will be required by a small child. The base of the bracket turns on a pivot, giving the whole arc of the circle. In a few words, the transmitter reaches and faces any point within a radius of two feet from a given centre. An improved switch and terminal post are used, being concealed in the heart of the bracket. As the bracket brings the telephone below the horizontal point many advantages may be secured in the location of the fixture for use by different persons.



When Mounted on the Desk the Cord does not Interfere with Papers, and the Telephone may be Adjusted for Use at Any Height, from Either Side of the Desk.

This combination makes an attractive apparatus for the wall, it being possible to stand up and use the telephone, and if a long conversation should take place, the telephone can be drawn down and the user sit in a chair and continue the conversation with great comfort. The spring causes the telephone to remain where it is put, with or without the receiver on the hook, and no friction is developed in the machine. The lower illustration shows the hook holding the receiver on a level with the transmitter, so the receiver will clear the arm and allow the whole stand to be rotated, to bring the transmitter into any desired position.

The fixture to hold the instrument can be placed anywhere that screws can be fastened. The instrument is very compact and beautifully made, and is an extremely attractive piece of apparatus.

THE ELECTRIC CABLE COMPANY, of 42 Broadway, New York, has received an order from the New York and Long Island Railroad Company for fifteen miles of cable insulated with Voltax, the new high potential insulating compound. This order follows within a week upon that of the Interborough Rapid Transit Company for the same amount of material. Severe tests are said to have shown that this material retains its elasticity and insulating properties

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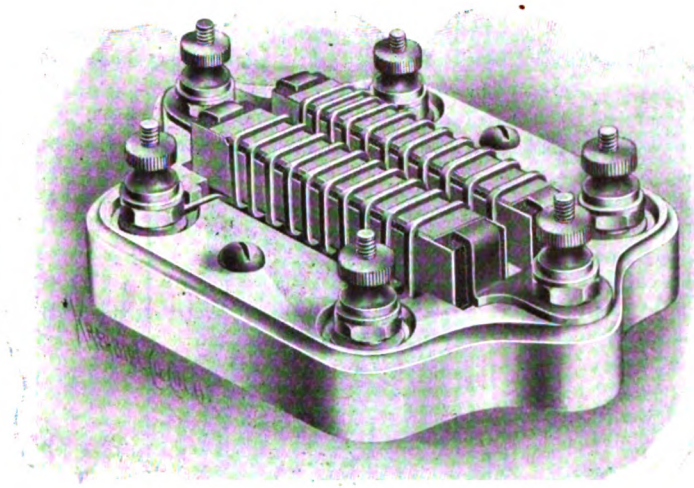
In Time of Snow Prepare
For the "Hot Time" Coming

In Summer Protect Your Telephones with the Mason Multi-Discharge Lightning Arrestor



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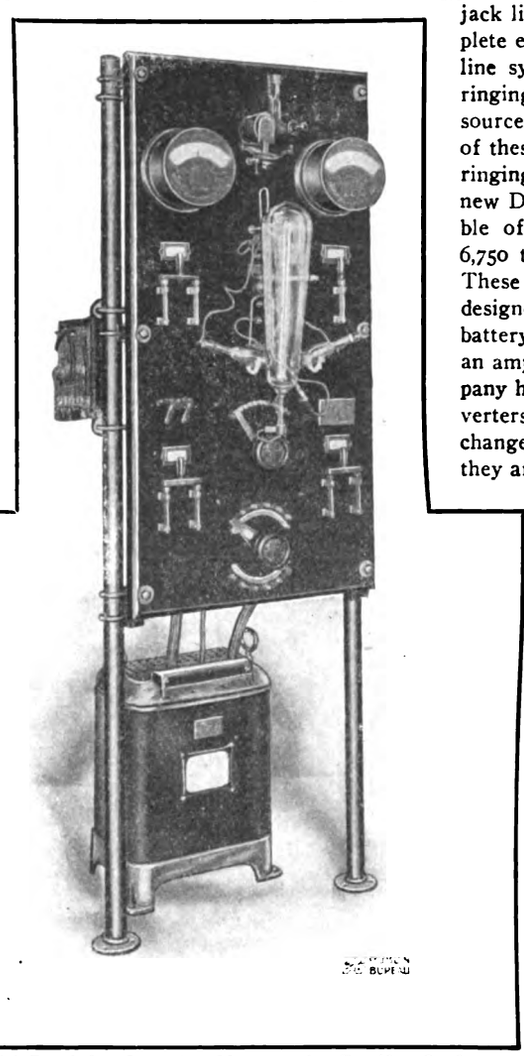
for an indefinite period, is impervious to atmospheric conditions, and is water, acid and alkali proof. Recent tests by the Electrical Testing Laboratories of New York show that the Voltax Compound will not drip under 200 degrees Fahrenheit.

A NEW METHOD OF CHARGING TELEPHONE BATTERIES.

THE mercury arc rectifier, manufactured by the General Electric Company has been most extensively used in automobile work, where it has been found to afford an extremely simple and convenient method of charging automobile storage batteries. The same reasons which have led to its adoption for this purpose also adapt it to the requirements of telephone battery charging. Owing to the comparatively low cost, compactness and high efficiency of this method of transforming alternating into direct current, there has arisen a demand for a telephone charging panel, and this has been met by an outfit developed by the General Electric Company.

The neat and compact appearance of one of these sets is seen in the accompanying illustration of a 30 ampere outfit. It consists of a mercury arc rectifier tube mounted on a black enameled slate panel with switches, measuring instruments, etc., and the necessary reactance coils. This panel stands 76 inches high and is 24 inches wide, and, as it need stand but 24 inches from the wall, is compact and self-contained. In the center of the panel, the rectifier is mounted in a substantial holder in such a manner that the shake necessary to start the tube in action can be easily given.



Special Panel for Operating Mercury Arc Rectifier Outfit.

Grouped about the rectifier are the switches and instruments, the whole presenting a neat and attractive appearance. High-grade instruments are supplied, the ammeter having its zero at the center of the scale, so as to read in either direction. There is also furnished an extenral shunt, with thirty-foot leads, to provide for a separate measuring instrument.

On the floor beneath the panel proper is located the reactance coil for adjusting the alternating current supply, thereby controlling the direct current. In addition, the General Electric Company furnishes with this outfit a suitable reactance which is so connected that it reduces the humming on the telephone circuits to a minimum. Tests of this rectifier, made by the American Telephone and Telegraph Company indicate that there is no noise on the line when the batteries are being charged. This is a point of great importance in the satisfactory operation of any charging device for telephone service.

A number of these outfits are in commercial operation in telephone exchanges, and letters from purchasers bring out the fact that their operation has afforded satisfaction.

THE STUTTGART TELEPHONE COMPANY, of Stuttgart, Ark., is installing the Baird Secret Service system and is putting in metallic lines for the purpose of securing the advantages claimed for this system.

MODERN EQUIPMENT AT QUINCY, ILLINOIS.

THE switchboard which will soon be installed at Quincy, Ill., is for a complete common battery multiple system and is to be arranged for 6,400 lines ultimate, and with an immediate equipment of 3,300 answering jack lines and 3,000 multiple jack lines. The exchange is to have a complete equipment of the Dean harmonic party line system, including individual indicating ringing keys in each cord circuit, and three sources of harmonic ringing current. One of these is to be a Holtzer-Cabot multicycle ringing set and the other two are to be the new Dean Harmonic Converters, each capable of ringing the entire exchange when 6,750 telephones are connected for service. These new Dean Harmonic Converters are designed to operate from a 24-volt storage battery and consume less than a quarter of an ampere no load current. The Dean Company has a number of these Harmonic Converters operating in common battery exchanges in various parts of the country, and they are said to not only give the best possible results in regard to the quality of the ringing current, but stand up under load and require absolutely no attention. Their extremely high efficiency renders them applicable to the smallest as well as the largest exchanges.

The power plant for this new Quincy exchange is to be complete in every respect, consisting of duplicate apparatus and power lightning protection equipment. A two-position combined chief operator's and monitor's desk and a three-position wire chief's desk are also to be included. The woodwork of the switchboard, desks and Harmonic Converters is to be of solid mahogany. The contract for this switchboard equipment, which has been awarded to the Dean Electric Company, of Elyria, Ohio, also includes the furnishing of 3,000 common battery telephones.

Messrs. McMeen & Miller have charge of the engineering of this new exchange, and the work of construction is being done by the Union Construction Company, of Quincy, Ill.

THE BLAKE SIGNAL AND MANUFACTURING COMPANY, 246 Summer street, Boston, Mass., has recently received a very satisfactory expression of approval of its insulated staples and compressed cleat, as follows: "From my inspection of the sample cleats sent us they seem to be what I often longed for when directing work in the field. For many places these are superior to your very excellent staples, as where it is necessary to run the wires on lath and plaster walls. They are superior to the staple in that they may be removed subsequently without damaging the insulation. I wish to congratulate you on your success in producing such good staples and cleats." (Signed) ARTHUR BESSEY SMITH.
Prof. Telephone Engineering, Purdue University.

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THE WEEK'S MESSAGES

FINANCIAL.

KENESAW, NEB.—The Kenesaw Telephone Company has declared a dividend of 8 per cent.

WARREN, N. H.—The Baker River Telephone Company has increased its capital stock from $1,000 to $3,500.

RUSHVILLE, O.—The Rushville Telephone Company has increased its capital stock from $5,000 to $10,000.

GLENWOOD, WIS.—The West Wisconsin Telephone Company has increased its capital stock from $7,000 to $15,000.

OCONOMOWOC, WIS.—The Badger Telephone Company has increased capital stock from $5,000 to $10,000.

FRANCHISES.

OAKLAND, CAL.—A franchise has been granted to the Home Telephone Company of Alameda County for a complete telephone system in this city.

SALEM, ORE.—C. E. Sumner has been granted a franchise at Salem. Telephone franchises have also been granted to the Home Telephone Company of Puget Sound at Tacoma and Bellingham.

SPOKANE, WASH.—A franchise has been granted to C. E. Summer, of Portland, Oregon, for the Home Telephone & Telegraph Company to operate a telephone system in Spokane.

WALLA-WALLA, WASH.—The Home Telephone & Telegraph Company has been granted a franchise at Walla-Walla.

COMBINATIONS.

RICHMOND, IND.—It is reported that the Richmond Home Telephone Company and the New Paris, Ohio, Telephone Company have consolidated, and that the two plants will be operated from Richmond. Both plants are among the best in existence.

PIPESTONE, MINN.—The Enterprise Telephone Company, which is extending its system in Pipestone, is to dispose of part of its system to the South Dakota Rural Telephone Company.

MILLERSBURG, O.—The property of the Marshallville & Rittman Telephone Company has been transferred to its purchasers, The Millersburg, Wooster & Orville Telephone Company.

ELECTIONS.

JESUP, IA.—The Farmers' Telephone Company has elected the following officers: Dr. Haradon, president; John Burrill, vice-president; C. L. Bright, secretary, and Charles Brush, treasurer.

LIBERTYVILLE, IA.—The Libertyville Telephone Company has elected the following officers: President, R. O. Sherrick; vice-president, Emery Wilson; secretary, Dan Garber; treasurer, Frank Glotfelty.

MALCOM, IA.—The Malcom Central Telephone Company has elected the following officers: President, Wm. McClure; vice-president, Chas. Eisele; treasurer, C. O. Bowers; secretary, S. E. Royce.

MT. AUBURN, IA.—The Mt. Auburn Telephone Company has elected the following officers: President, John St. Clair; vice-president, L. C. York; directors, C. H. Lawson, K. K. Lamb and George Larmor.

NEVINVILLE, IA.—The Nevinville Telephone Company has elected the following officers and directors: R. H. Gregory, manager; directors: Fred Johnson, Frank Spellman and P. M. Gregory.

ROLAND, IA.—The following officers have been elected by the Roland Mutual Telephone Company: President, Dr. E. Rice; vice-president, J. H. Larson; secretary and treasurer, J. H. Jondall.

WHITE OAK, IA.—The White Oak Telephone Company has elected the following officers: E. F. Varnholt, president; George Miller, vice-president; D. C. Bowers, secretary; Amandus Lehr, treasurer.

ATCHISON, KAN.—The Atchison Telephone Company has elected the following officers: President, Theodore Gary; vice-president, J. I. Berry;

SALINA, KAS.—The Salina Telephone Company has elected the following officers: J. O. Wilson, president; John Anderson, vice-president; Clarence Wilson, secretary; Fred H. Quincy, treasurer; D. A. Van Trine, general manager.

MARSHALL, MICH.—At a meeting of the North Marshall Telephone Company the following officers were elected: President, Frank Bell; vice-president, Fred Huggett; secretary, Frank Lovejoy; treasurer, John Sackett.

PENTWATER, MICH.—The Lake Shore Telephone Company held its annual meeting and elected the following officers: H. S. Newton, president; G. F. Sands, vice-president; J. K. Flood, secretary; L. P. Hyde, treasurer; E. A. Fuller, manager. The present number of telephones in the Oceana Division is 852.

MORRISTOWN, MINN.—The Morristown Telephone Company has elected the folowing officers: J. C. Knauss, president; W. F. Sweetser, vice-president; L. A. Kisor, second vice-president; L. J. Eisert, secretary; S. R. Miller, treasurer.

TECUMSEH, NEB.—The Johnson County Home Telephone Company has elected the following officers: President, S. D. Davidson; vice-president, P. W. Hopkins; treasurer, Harry Phelps; secretary, F. F. Cobb.

BAINBRIDGE, N. Y.—The Bainbridge Telephone Company has elected the following officers: President, W. H. Hastings; vice-president, B. G. Allen; secretary, A. A. Hoyt.

COOPERSTOWN, N. Y.—The Otsego Home Telephone Company has elected the following officers and directors: President, George R. Fuller; vice-president, Geo. Whitman; secretary, John Losee; treasurer and manager, H. P. McDonough. Directors: Geo. R. Fuller, T. S. Lane, H. A. Harrison, Geo. Whitman, T. Harvey Ferris, H. P. McDonough and John Losee. The company will spend $30,000 in new construction this year.

GALWAY, N. Y.—The Galway Telephone Company has elected the following officers: President, M. McWilliam; vice-president, Walter L. Cavert; secretary and treasurer, F. L. Smith.

PORT JERVIS, N. Y.—The Port Jervis Telephone Company has elected the following officers: President, Moses Depuy; vice-president, Dr. Cuddeback; secretary, A. Parshall; treasurer, E. F. Mapes.

CONNEAUT, O.—The Conneaut Telephone Company has elected the following officers: H. H. Hunt, president; A. J. Jacker, vice-president; M. Goebricher, secretary and manager; treasurer, G. M. Brown.

DAMASCUS, O.—The Damascus Telephone Company has elected the following officers: President, A. R. Cobbs; vice-president, J. S. Walker; secretary and general manager, L. F. Pearce; treasurer, G. A. Kinsey; financial secretary, E. H. Walker.

HIRAM, O.—The Hiram Telephone Company has elected the following officers: President, F. W. Hurd; vice-president, W. D. Dudley; secretary, W. N. White; treasurer, H. F. House; manager, H. C. Hurd.

URBANA, O.—The Urbana Telephone Company has elected the following officers: President, C. H. Marvin; vice-president, J. I. Blose; secretary, E. R. Cheney; treasurer, J. C. Powers.

CLARKSVILLE, TENN.—At a meeting of the Board of Directors of the Home Telephone Company the following officers were elected: Dancey Fort, president; B. F. Gill, vice-president; W. E. Beach, treasurer; H. M. Perry, general manager and secretary.

NEW COMPANIES.

FORREST CITY, ARK.—The Caldwell Telephone Company, with its principal office at Forrest City, has been incorporated with a capital stock of $5,000. The incorporators are: W. C. Beazley, president; F. M. Satterfield, A. L. Bynum, Henry Hughes and others.

BURRITT, ILL.—The Burritt & Winnebago Telephone Company, Burritt, has been incorporated with a capital stock of $2,450. Incorporators: James McNair, W. H. Keith and Frank Colahan.

CARBONDALE, ILL.—The Ohio & Mississippi Valley Telephone Company, Carbondale, has been incorporated with a capital stock of $100,000. Incorporators: J. B. Bundy, F. W. Willard and Wm. H. Warder.

GREENVILLE, ILL.—The Bond County Telephone Company, Green-

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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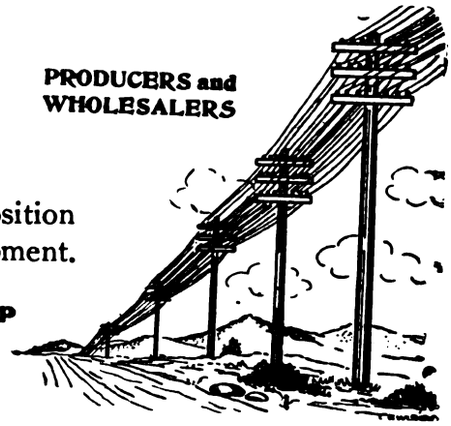

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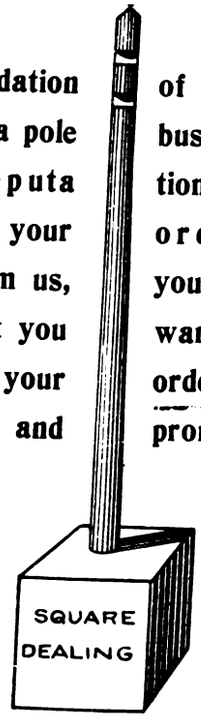

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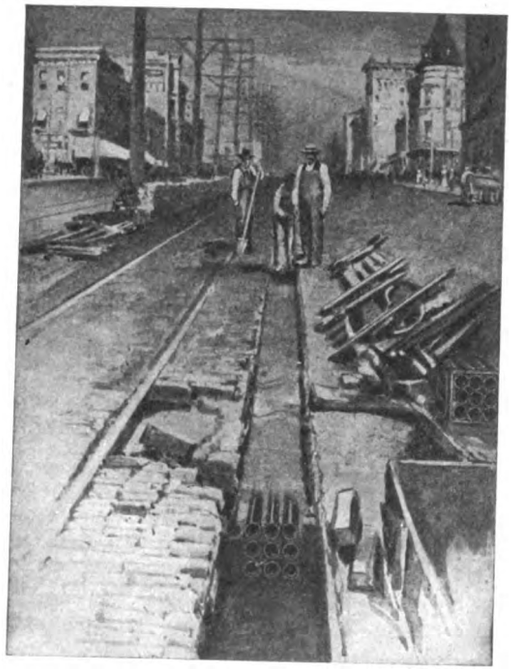

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THE WEEK'S MESSAGES

ville, has been incorporated with a capital stock of $6,000. Incorporators: J. S. Bradford, E. E. Wise and G. V. Weise.

CINCINNATUS, N. Y.—The Otselic Valley Telephone Company is to be incorporated with a capital stock of $10,000. The following are the directors of the company: P. C. Wheeler, F. M. Davis, E. W. Terrill, William Edwards, A. Fowlson, J. M. Murray and J. M. Lotridge.

NEWFIELD, N. Y.—The Cayutaville Telephone Company, Newfield, N. Y., has been incorporated with a capital stock of $3,000. Incorporators: J. F. Smith, T. J. Smith and Wheeler Smith, all of Newfield, N. Y., and others.

TRUMANSBURG, N. Y.—The Trumansburg Independent Telephone Company has been organized. The officers of the company are: President, Walter McKeel; vice-president, Frank Miller; secretary, Frank Carman, and treasurer, I. McKeel.

PERSONAL.

LELIO BORNO has assumed the direction of the telephonic service of Port au Prince, the capital of the Island of Hayti, West Indies.

CECIL FEARIS has been appointed manager in Waxahachie, Texas, for the Ellis County Independent Telephone Company.

LELAND HUME has been promoted from the office of assistant general manager to that of general manager of the Cumberland Telephone Company. Mr. Hume was also elected president of the Nashville Board of Trade.

FRED LININGTON, who has been manager of the exchange of the Southwestern Telephone and Telegraph Company at Houston, Tex., has been appointed superintendent of construction in the State of Arkansas, with headquarters at Little Rock.

WILL T. VAUGHAN has been appointed manager at Mayfield, Kentucky, by the Cumberland Telephone Company.

MISCELLANEOUS.

CARTHAGE, IND.—R. S. Hamilton, of Morristown, Ind., has recently closed an active canvass for the Independent Telephone Company. A rental list of 790 was raised to 1,005 in sixty days.

JUDSON, IND.—The co-operating telephone lines entering Judson have organized the Judson Switchboard Association, and claim to have the system on a paying basis. A new contract with the Park County Telephone Company, on the same basis with the local company's contracts now in force with other co-operative companies, provides that the patrons of the Park County Telephone Company shall pay a line charge of five cents per call for the use of the Judson line.

ORLAND, IND.—A fire alarm service has been inaugurated on the lines of the local telephone system.

HOLT, MO.—The Holt Telephone Company has severed connections with the Bell company and will hereafter be connected with the long distance lines of the Home Telephone Company of Kansas City. The company has installed new central office equipment.

HURDLE MILLS, N. C.—The North Carolina Telephone Company now has in operation 60 miles of line and is giving excellent service. Its plant is so well constructed that no damage was done by the recent heavy sleet storm. The company recently paid a quarterly dividend of 12 per cent.

WASHINGTON, O.—The Institute Telephone Company has been reorganized.

VIBORG, S. D.—The Tri-County Telephone Company's exchange was destroyed during a recent fire at Viborg.

EFFINGHAM, ILLS.—The Wabash Valley Telephone Company has been rapidly increasing the number of its subscribers during the past three months. The number has been raised from 110 telephones three months ago to 225 at present.

READING, MICH.—The Reading Central Telephone Company has closed a contract with the Steuben County Electric Telephone Company by which rates to Indiana points are materially lowered. The Steuben company owns 18,000 telephones in the county with 26 toll stations and has trunk line connections with 145,000 telephones in Indiana.

HOMER, N. Y.—The Cortland Home Telephone Company has agreed to install a fire alarm system for the town.

TOLEDO, O.—The Toledo Home Telephone Company has decided to extend the system of four-party, selective call, lockout telephones. The rate for service from these instruments will be $18 a year net.

New Construction in the Field

OAKLAND, CAL.—The Home Telephone Company is to place its wires underground.

NEZ PERCE, IDAHO.—The Nez Perce Co-operative Telephone Company is to build a line into Grangeville.

DECATUR, ILL.—The Citizens' Telephone Company, of Decatur, is to build party lines in all directions from Berne.

CARYDON, IND.—The Harrison County Telephone Company is extending its lines to the Floyd county line near Georgetown, where connection will be made with the line of the Home Telephone Company of New Albany and Louisville.

OWENSVILLE, IND.—The Independent Telephone Company of this city is to install a new switchboard.

ELK HORN, IA.—The Marne & Elk Horn Telephone Company is to extend its lines to Audubon.

KINSLEY, KAS.—The Kinsley Telephone Company is to build a line to Kirkfield.

BOWLING GREEN, KY. The Home Telephone Company is to establish an exchange at Russellville.

ELLSWORTH, ME.—A. M. Fogg has completed the construction of 51 miles of metallic lines and installed 50 telephones for the Union River Telephone Company in Hancock County. The line runs from Ellsworth to Great Pond, via Waltham, Amherst and Aurora.

ST. PETER, MINN.—The Cannon Valley Telephone Company is to spend $4,000 in improving its system.

PATERSON, N. J.—The Paterson, Passaic & Suburban Telephone Company is to build lines into most of the surrounding towns.

CHAMPLAIN, N. Y.—The Champlain Telephone Company is to extend its system to Mooers Forks.

DELPHI FALLS, N. Y.—Messrs. Cummings and Stoddart are to extend their telephone lines to Pompey Hollow.

ITHACA, N. Y.—The Ithaca Telephone Company has commenced the construction of its underground system.

HURDLE MILLS, N. C.—The North Carolina Telephone Company will soon install a new switchboard at Rougemont, N. C., and is putting in a metallic line from Rougemont, via Bahama, to Durham, N. C.

NANTICOKE, N. Y.—The Glen Aubrey and Whitneys Point Telephone Company is building a line from Ketchumville toward Newark Valley; also south toward Maine through a territory which has been without service. From Nanticoke lines are being extended northward to Caldwell Settlement. Another pair of wires will be run from Nanticoke to Whitneys Point and from Aubrey to Lisle.

RUSHVILLE, N. Y.—The Seneca-Gorham Telephone Company is building several new lines.

WARREN, N. Y.—The Warren Telephone Exchange of the Union Telephone & Telegraph Company is to be connected with Yankee Bush.

CLEVELAND, O.—President Frederick S. Dickson, of the Cuyahoga Telephone Company, has recommended the expenditure of $600,000 for construction work.

LEBANON, OHIO.—The Valley Telephone Company is to install a complete new exchange.

PORTLAND, ORE.—Work is progressing rapidly on the underground system of the Home Telephone and Telegraph Company. When completed, there will be more than fifteen miles of trench, and of this amount more than one-half is now ready for the cable.

ASHLEY, PA.—The People's Telephone Company is to establish an exchange.

DUNN'S STATION, PA.—The Farmers' Telephone Company is to build a telephone line from Dunn's Station to Amity.

SUGAR RUN, PA.—A Farmers' telephone line is to be built from Sugar Run to connect with the Bradford County Telephone Company at Wyalusing.

IPSWICH, S. D.—The Edmunds County Telephone Company plans many important extensions to its system in the near future.

KNOXVILLE, TENN.—The People's Telephone and Telegraph Company is preparing to put down more underground conduits for its lines. Two car loads of material have arrived and the work of laying underground wires will be begun in a short time.

NASHVILLE, TENN.—The Nashville Mutual Telephone Company is to construct lines to Venedy, Okawville and Addieville.

CANADIAN, TEXAS.—The Stockmen's Telephone Company, of Canadian, Texas, is building lines to Lipscomb and Ochiltree, as well as towns in Beaver and Woodward Counties, Oklahoma.

PULLMAN, WASH.—The Ewartsville Telephone Company is to build lines to Pomeroy, Dayton and Walla Walla.

ELM GROVE, W. VA.—The National Telephone Company, of Wheeling, W. Va., is to establish an exchange at Elm Grove.

OSCEOLA, WIS.—The Osceola Farmers' Mutual Telephone Company is considering the construction of a telephone line to Milltown.

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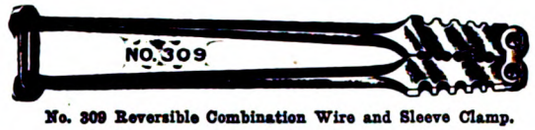

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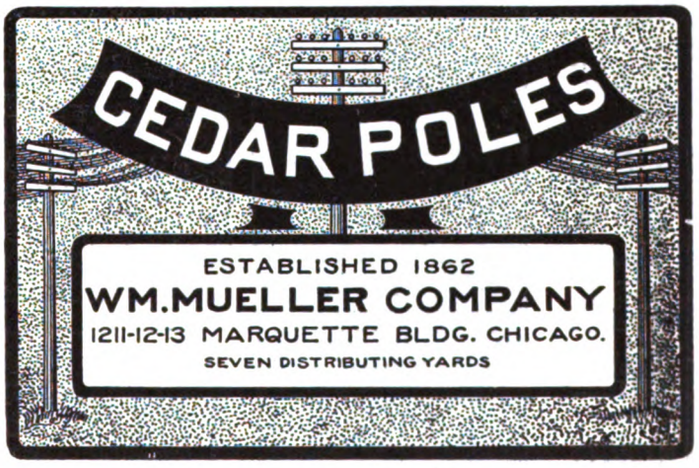

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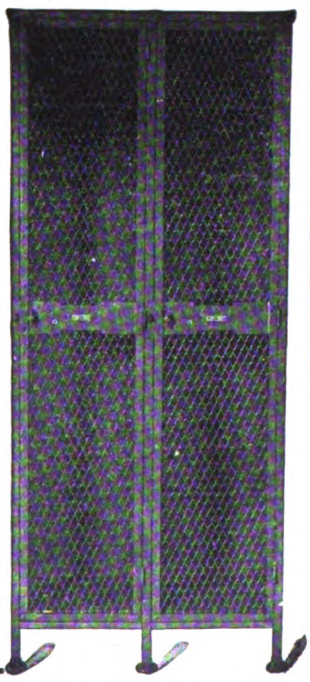

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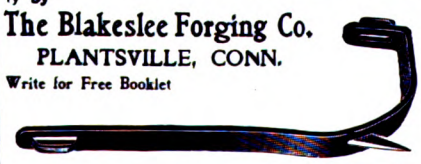

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Cord Troubles Are Past if You Use the "EACO" STEEL SWITCHBOARD CORD

The general appearance of all makes of Cords are about the same, but when quality is taken into consideration there is a vast difference. "Eaco" Steel Switchboard Cords have the quality and give the service Exchange Managers are looking for. Our prices are right, our Cords are right. Send for sample.

ELECTRIC APPLIANCE COMPANY, Chicago, Telephone Manufacturers

BRANCHES: SAN FRANCISCO, DALLAS, NEW ORLEANS

STRENGTHEN THOSE LEADS NOW

You don't have to thaw the ground. DRIVE a D. & T. Anchor THROUGH THE FROST. TWIST it UNDER the frost. We guarantee them to operate through TWO FEET OF FROST.

NOTE the V shaped eye. That is what does it. Ask your jobber or write

THE D. & T. ANCHOR CO., La Crosse, Wis.

QUALITY IS OUR POLICY — MAKERS of TELEPHONES — EVERYTHING ELECTRICAL

You do not have to pay a fancy profit to anyone when you buy

WESCO Telephones

We consider our telephones more in the nature of an advertisement for our supply business (the largest of its kind in the U. S.) than as a means of direct profit, and can therefore afford to put more real value into them and sell them at a smaller margin of profit than the exclusive telephone manufacturer can possibly afford to do.

Send for booklet and be convinced. Send for samples and you will be sure of it.

WESCO **THE WESCO SUPPLY CO.** WESCO

FT. WORTH, TEX. ST. LOUIS, MO.

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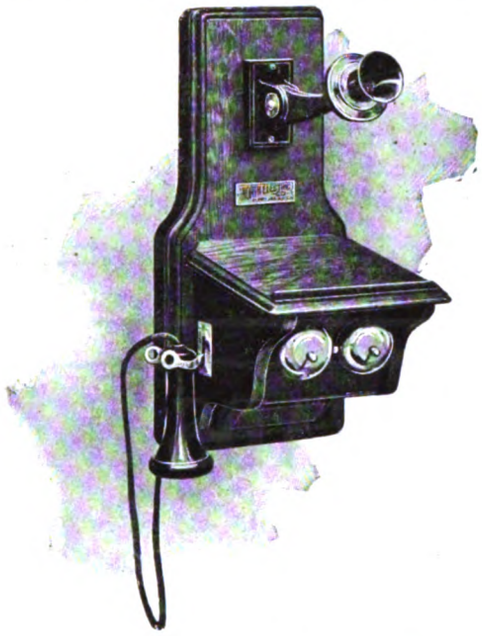
NORTH COMMON BATTERY TELEPHONES



The hinged front of "NORTH'S" common battery wall type telephone renders the condenser and instrument wiring accessible without removing from the wall.

The cabinets are not veneered, but every stick of lumber is from a veneered mill; for they handle nothing but the most beautifully figured woods. The stock is 18 months old, kiln dried 30 days and given a hand-rubbed finish involving 7 processes.

They are equipped with the following standard parts, and will operate on any standard common battery system.

"NORTH'S" Solid Back Transmitter that combines ample volume, perfect articulation, deep penetration and natural pitch.

"NORTH'S" Permanently Adjusted Receiver. The diaphragm does not rest on the outside shell, but on a bell-shaped metal seat—it isn't thrown out of adjustment by unequal expansion of hard rubber and magnet metal.

"NORTH'S" New Ringer, provided with a knife-edge, weighing-scale bearing armature—it can't tighten or drop out of place.

"NORTH'S" Horizontal Lever Adjustable Tension Switch-hook with long flexible contact springs—they can't break or become misplaced, and always resume their normal positions.

The parts are individually tested—the transmitter by an engineer. There are two inspections during assembling, a final test on completion and again a test before shipping—just to make sure.

THE NORTH ELECTRIC CO.

CHICAGO CLEVELAND DALLAS

OF INTEREST TO YOU

"STANDARD" TYPE XX

If you are in any way connected with, or interested in, the purchasing end of a telephone system, this will be of interest to you.

We manufacture and sell direct, the most practical and improved telephone condensers on the market—

Andrae Condensers

They come in three distinct styles—two illustrated herewith—and each style is fully guaranteed.

To convince you of the reliability and worth of these instruments and to show the utter confidence we place in their ability to "make good," we will equip an entire line on trial and pay return charges if not found satisfactory.

Could we offer you a more liberal proposition?

"ANDRAE TELEPHONES NEVER DISAPPOINT"

Our catalog can be had for a postal. Why not send for it TO-DAY?

No. 186

JULIUS ANDRAE & SONS COMPANY, 99 WEST WATER STREET MILWAUKEE, WIS.

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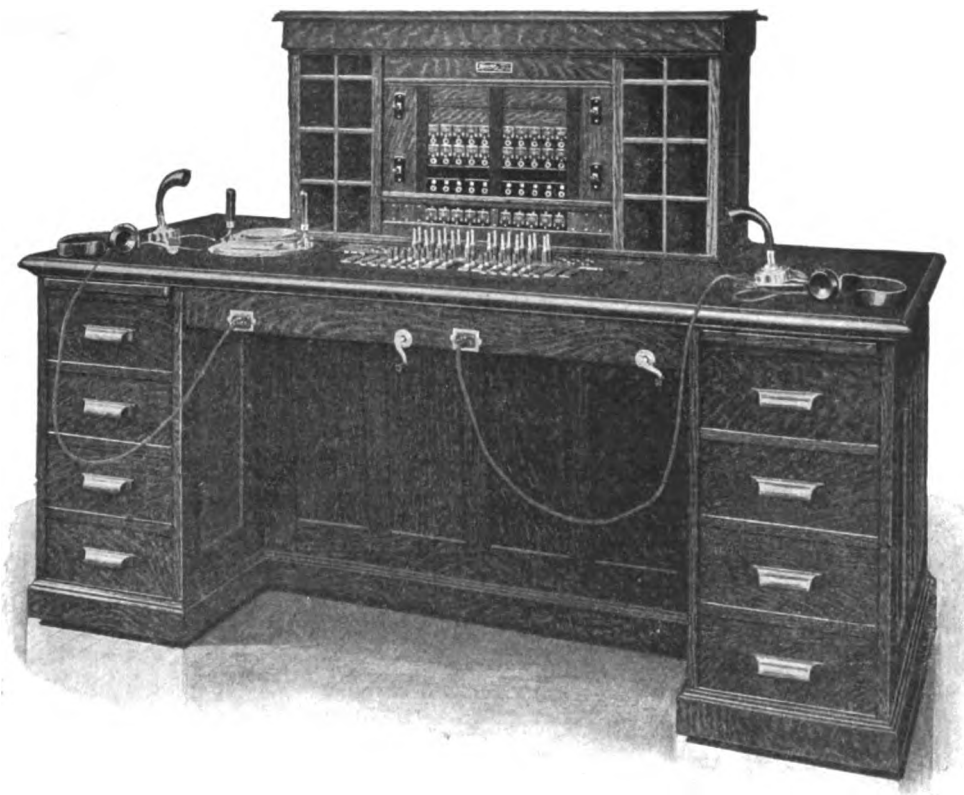
MONARCH APPARATUS

TOLL BOARDS



The Monarch drop is especially adapted to toll work. It is sensitive and efficient, and the armature adjustment feature insures a distinct signal on every line. We make all types and sizes of toll boards, and are prepared to embody the latest circuits and ideas of operation. The illustration above shows a two position board with a capacity of forty toll lines, twenty transfers, sixteen cord circuits and two operator's sets. Write for full description of our toll boards. The apparatus is good. The prices are reasonable.

MONARCH TELEPHONE MFG. CO.

10-16 So. Clinton Street, - CHICAGO, ILL.

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DEAN TELEPHONE APPARATUS

THE DEAN ELECTRIC COMPANY
HARMONIC CONVERTER
TRADE MARK

A New Harmonic Ringing Machine

We have published from time to time the name Harmonic Converter in our advertisements. This new device has now passed the experimental stage and has been thoroughly tried in practice so that we now feel at liberty to make an announcement.

This Harmonic Converter is a new device for economically supplying alternating ringing currents for harmonic selective party lines, and to do all of the regular ringing of the exchange.

It operates from any direct current source, primary battery, secondary battery or from the power plant of a common battery exchange.

The ringing current delivered by the Harmonic Converter is strictly alternating in character and so designed to give the best possible results without causing noise in the talking circuits or any inductive disturbances in the lines when ringing.

The current consumed to operate this Harmonic Converter is 1-50 of that required to run a motor generator set of equal capacity.

This machine can be made for any size exchange, local or common battery. In fact we now have a great number of these Converters already supplying all the ringing current in exchanges ranging in size from one position up to 6,400 lines.

If you are conscious of your geniousness in the telephone field, you can demonstrate it no better way than by using the Dean harmonic selective system with a Dean Harmonic Converter for supplying the ringing current. Write for our folder No. 5 which gives complete details of this remarkable invention.

The Harmonic Converter is manufactured only by

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY —————— **THE BEST IS THE CHEAPEST**

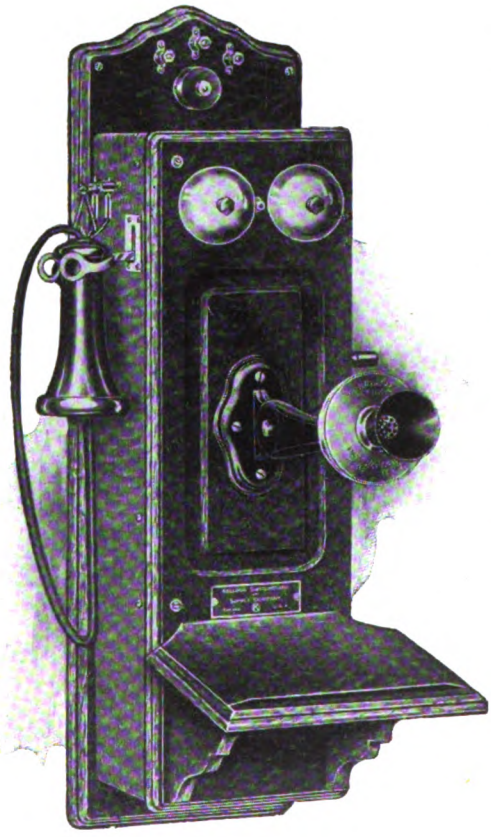
KELLOGG
BRIDGING TELEPHONES

Manufacturers of Telephone Switchboards of any size and description for common battery and magneto systems. Telephones of all kinds, Telephone and Line Supplies, Switchboard Cables, Wires, Poles, Miniature Lamps.

Highest Awards
GOLD MEDAL
Buffalo, 1901

GRAND PRIZE
St. Louis, 1904

Our telephones are built to last, and the "Kellogg" Guarantee is back of every one we sell.
Send for Folder No. 1.



FOUR GOOD SPECIALS

Set No. 1303—With Grounding Key. With this attachment you can ring the other subscribers on your line without calling the exchange. Or, you can call the exchange operator without ringing the other bells on the same line. SIMPLE—INEXPENSIVE—EFFECTIVE.

Set No. 1298—Condenser in the Secondary Circuit. Bells can be rung when all the receivers are off their hooks. Indispensable for heavily loaded lines.

Set No. 1274—Transmitter Cut-Out. Saves batteries and is a great convenience.

MADE TO ORDER—Selective 2 or 4 Party Instruments with Direct Current Generators. Enable you to call central without ringing the other parties on the line.

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES

PHILADELPHIA, PA.	CLEVELAND, OHIO	NEW YORK CITY	LOS ANGELES, CAL.
Keystone Tel. Building	Electric Building	116 Nassau Street	318 W. Second Street

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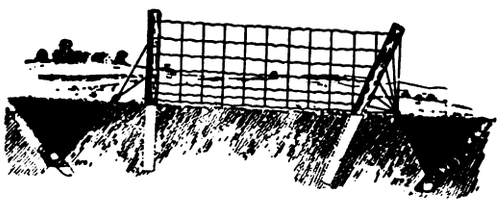
"Hercules" Anchors

MADE OF MALLEABLE IRON



"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

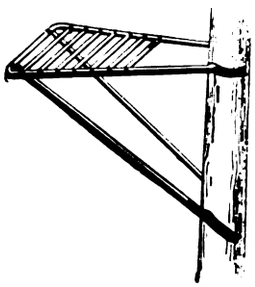
"HERCULES" Anchors will not creep.

Send for Prices and Circulars

The W. G. Nagel Electric Co.

28-32 ST. CLAIR ST. TOLEDO, O.

Security Seats That Carry a Ton



SECURITY POLE SEATS combine strength with lightness. They meet every need. Will carry a ton.

Most cable poles are already overloaded; then WHY ADD A HEAVY, COSTLY AND UGLY SEAT?

SECURITY Pole Seats have no rough edges; no cutting of hands or clothing.

OUR PRICES PROVEN LOWEST ON COMPARISON.

BRIGHT AND CLEAN AFTER TWENTY YEARS

Marlin wrapping cut from a vessel after 20 years' exposure---though weather-beaten outside---has been found bright and clean at the core.

Our marlin is three ply; each ply will bear 50 lbs. or more.

SECURITY CABLE HANGERS are made to fit any size cable and messenger strand. In ordering give these diameters.

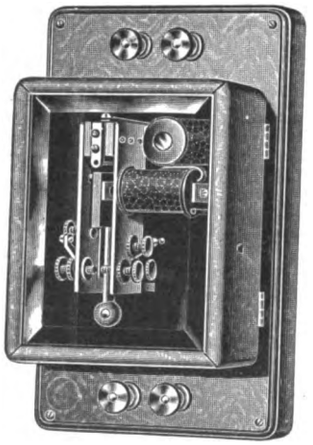
WRITE FOR FURTHER INFORMATION AND PRICES

TOLEDO, OHIO THE F. BISSELL COMPANY TRADE MARK

THE F. BISSELL COMPANY,
TOLEDO, O.

SIMPLICITY
is the Keynote of Success

A simple device which accomplishes the same results as a more complex one is certainly more preferable. The Sandwich Pole-Changer is the simplest device ever constructed for ringing purposes. There are but three contact springs and as these engage alternately with their opposite sides they cannot be forced out of position by constant use.



It requires no adjustment, as this is done at the factory and is permanent.

The use of a primary constant current battery to operate the vibrator has been dispensed with; a minute quantity of current, hardly a milliampere, being taken from the ringing battery, through suitable resistance coils for this purpose.

It will work in either a vertical or horizontal position, which permits it being hung on a wall or mounted on a cabinet. Another excellent feature is that it is practically noiseless. There are others which are described in our free booklet. Let us send it to you.

THE SANDWICH POLE-CHANGER CO.
400 EDDY STREET, SANDWICH, ILL.

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THE STANDARD

"HEMINGRAY"

All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.
Established 1848

The Bill Collector Has No Terrors

For the Manager whose lines are equipped with

BAIRD PAY STATIONS

They furnish a *Cash Reserve* in time of need. *Try one on approval*

BAIRD MANUFACTURING CO., 6 Michigan St., Chicago

NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.
GRAND RAPIDS, MICH.
COLUMBUS, OHIO.
DAYTON, OHIO.
LINCOLN, NEB.
PORTLAND, MAINE.
AUBURN, N. Y.
LEWISTON, MAINE.
SIOUX CITY, IOWA.
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COLUMBUS, GA.
SOUTH BEND, IND.
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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

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This Way Out

No. 18

Mr. Manager, are you having trouble with the most important end of the telephone business——

THE TELEPHONE

If so

Take the Beaten Path

Follow the Crowd

GET A STERLING

Sterling Electric Co.

La Fayette, Ind.

YAH THEY TALK AS WELL IN GERMAN AS IN ENGLISH

WE ARE TALKING TO YOU FROM CHICAGO

WE WANT TO TELL YOU

THE

FARR TELEPHONE & CONST. SUPPLY CO.

118 and 120 W. Jackson Blvd.

CHICAGO

CAN SAVE YOU MONEY

SEND FOR OUR CATALOGUE

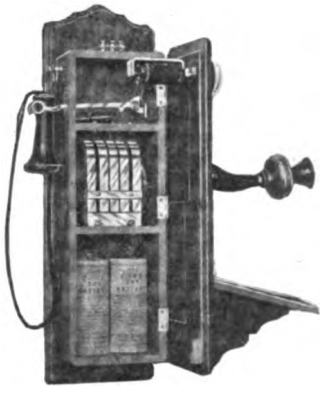
AND PRICES ON TELEPHONES, SWITCHBOARDS, LINE CONSTRUCTION MATERIAL AND LINEMEN'S TOOLS.

WE MAKE IT A BUSINESS.

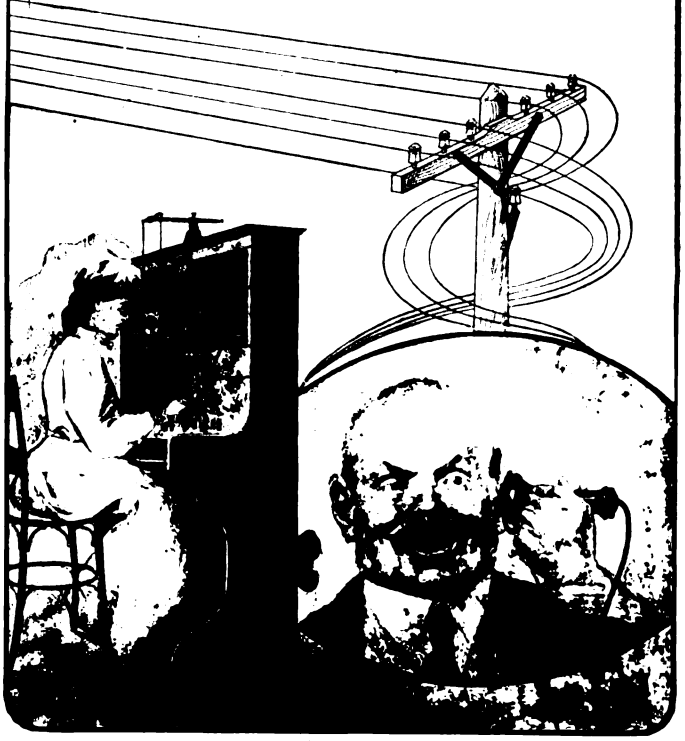
SUPPLYING THE TELEPHONE TRADE FOR THE PAST 10 YEARS.

WE WILL OPEN AN ACCOUNT WITH YOU AND SHIP YOUR ORDER SAME DAY RECEIVED.

SEND FOR ONE OF OUR EXCHANGE OR TOLL LINE TELEPHONES ON 30 DAYS' TRIAL. RETURN AT OUR EXPENSE IF IT DON'T SUIT.



No. 14 Bridging Telephone



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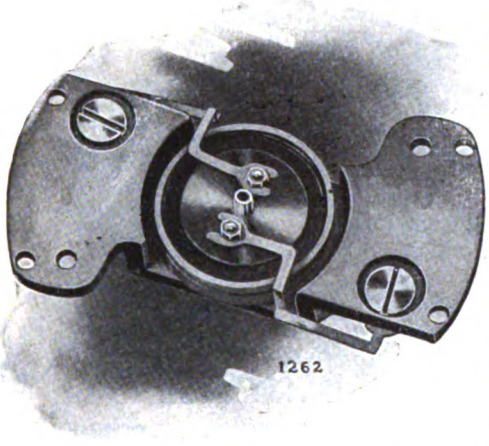
The Stromberg-Carlson Transmitter



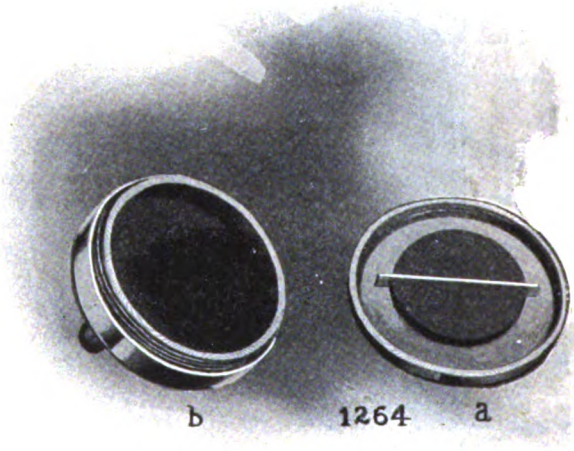
DIAPHRAGM WITH CONNECTORS AND CARBON CUP ATTACHED

Is decidedly different from any other you have ever seen. Different in ways that count for better transmission. This is quite noticeable when the transmitter is used on long distance lines. At a very slight cost you can prove this to your entire satisfaction.

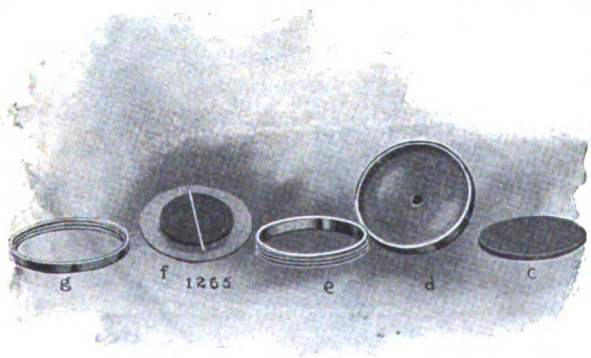
Why not do it?

THE ELECTRODES

Are made of carbon, and both are attached to the central point of the main diaphragm. There is thus produced a variation in the distance between the electrodes of twice the amplitude of variation of the central point of the main diaphragm. It is unnecessary to claim greater volume of transmission than if only one electrode moved.



CARBON CUP WITH CARBON REMOVED



PARTS OF CUP

We give the transmitter such an adjustment that under ordinary tones of voice the volume is not as loud as some of the forms of sensitive transmitters now on the market. As the voice is raised, however, the volume of transmission from the instrument is multiplied two-fold so that the transmission, when talking in a loud tone of voice, has much more volume than that of any other type. The advantage of this is readily seen.

Let us send you our new booklet describing and illustrating this transmitter. It tells the whole story; we mail it free. Just ask for Booklet No. 91-B.

Stromberg-Carlson Tel. Mfg. Co.

Rochester, N. Y. **Chicago, Ill.**

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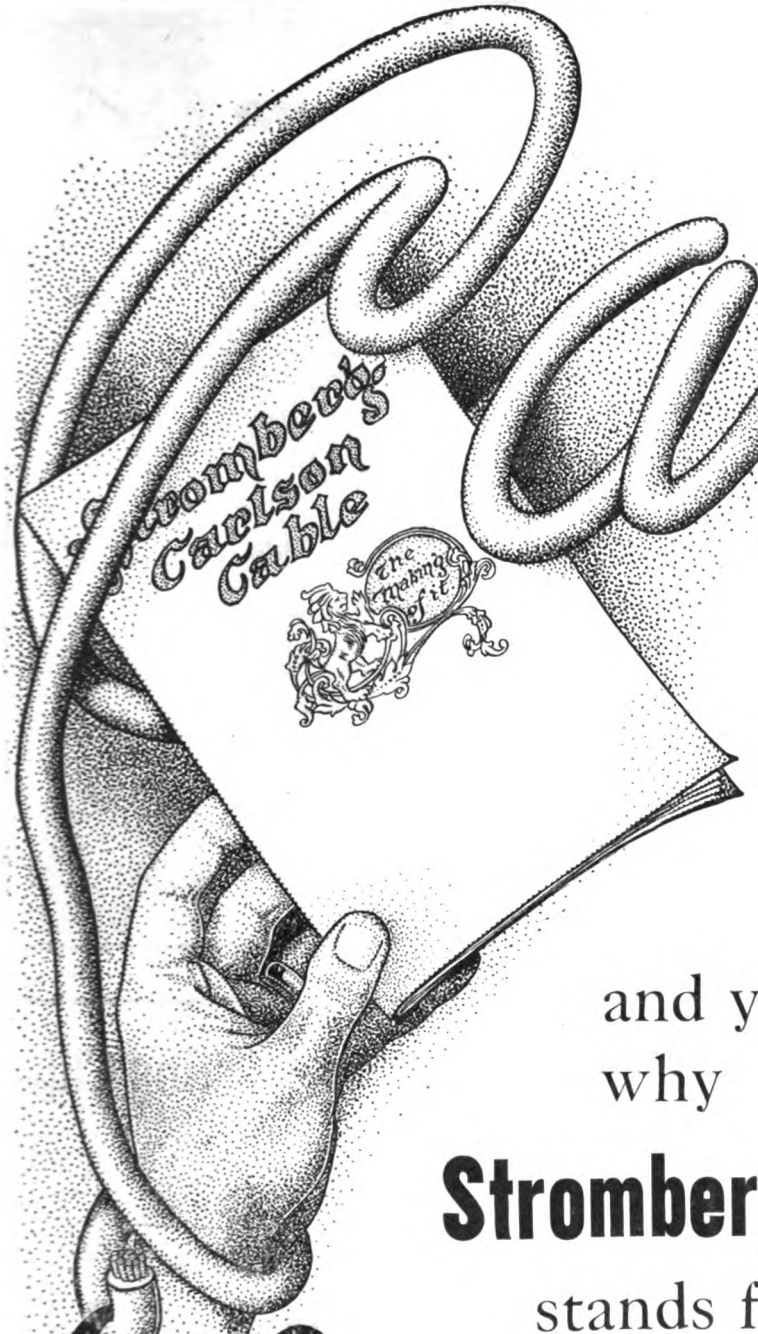
Cable



This book tells how we make lead encased cable.

Read it through and you will understand why

Stromberg-Carlson Cable

stands for QUALITY.

We mail it postage paid to any telephone man. Just ask for Booklet No. 79-B.

Stromberg-Carlson

Telephone Manufacturing Company

Rochester, N.Y. Chicago, Ill.

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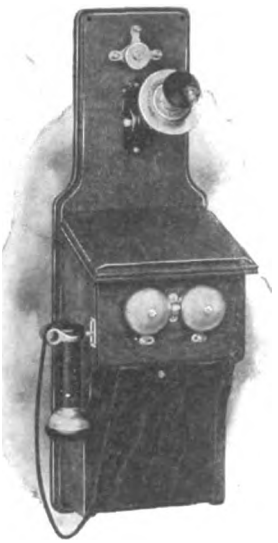
IMPROVED

Compact Magneto Telephone

No. 88.

New Swedish Beauty.



NO. 88—CLOSED.

SERIES OR BRIDGING.

Built with a view of permanent good service, 100 per cent. good.

TELEPHONE BUYERS

we ask you to investigate; a card from you will get our proposition by return mail. You cannot afford to be indifferent to a business opportunity of this character.

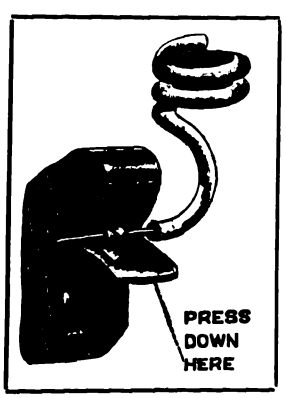
NO. 88—OPEN.

Swedish-American Telephone Co.

CHICAGO.

Not Yet But Soon

we expect that every dry battery sold will be equipped with FAHNESTOCK SPRING BINDING POSTS. There are several reasons that confirm us in the belief. It is the only post ever devised which eliminates uncertain contacts. When a wire is introduced between the spring clasps of a Fahnestock post, it is going to stay. No amount of vibration will work it loose.



Those who have tried it, know this to be true, and what is more, they would as soon buy telephones equipped with the old Blake transmitter as to accept a barrel of dry cells which are furnished with screw posts.

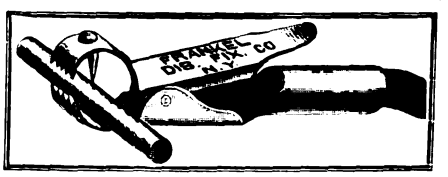
Any man that is honest and who has tried the Fahnestock post will tell you that everything we claim for it is true, but if you want to demonstrate its good points for your own satisfaction, we'll send you a sample free.

All battery makers equip their dry cells with this post free of charge if you demand it, and we are sure you will if you see a sample.

FAHNESTOCK ELECTRIC CO., 129 Patchen Avenue **BROOKLYN, N. Y.**

SAMPLE ON REQUEST

Frankel's Electric Testing Clip



Patented Nov. 15, 1904.

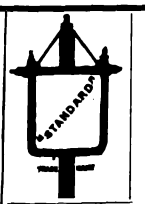
Sample dozens...$1.50 per doz. Lots of 500.....10.00 per 100
Lots of 100.....11.00 per 100 Lots of 1000..... 9.00 per 100

GET out of that rut of skinning the wires—IT'S EXPENSIVE.
THIS device will save both valuable time and material—THAT'S PROFIT.
The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

FROM YOUR SUPPLY HOUSE, OR

FRANKEL DISPLAY FIXTURE CO., 718 Broadway, N. Y.

Telephone Wire



and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — **Aerial—Underground—Submarine Lead Covered Cables**

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company,

PITTSBURGH, PA.

BOSTON. NEW YORK. PHILADELPHIA. CHICAGO. ST. LOUIS. SAN FRANCISCO.

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VOLUME XIII *SATURDAY, MARCH 3, 1906* *NUMBER 9*

Some Telephone High-Tension Crossings

By John Putnam.

Illustrations from Original Sketches by B. S. Stevens and Photographs by the Author.

RISING in the Berkshire Hills, and flowing south and southeast, along the western border of Connecticut, is the Housatonic River. In the Algonquin Indian dialect its name was Wassatunick, meaning "bright stream flowing through the rocks." It has been called the most beautiful river in Connecticut, for along its banks there is a variety of scenery of the most charming description. It is navigable for small boats for a short distance from its mouth, perhaps nine or ten miles, but it has a more practical value fifty miles farther above. There, in the northwestern part of Connecticut, the river drops about a hundred feet in each five miles. The early settlers appreciated this source of power, and along the river banks they built their saw and grist mills. These were, in their turn, driven out by the steam engine. Engineers, however, are again turning their attention to the river's bountiful strength, and aided by long distance electric power transmission are delivering that power where it will be most useful.

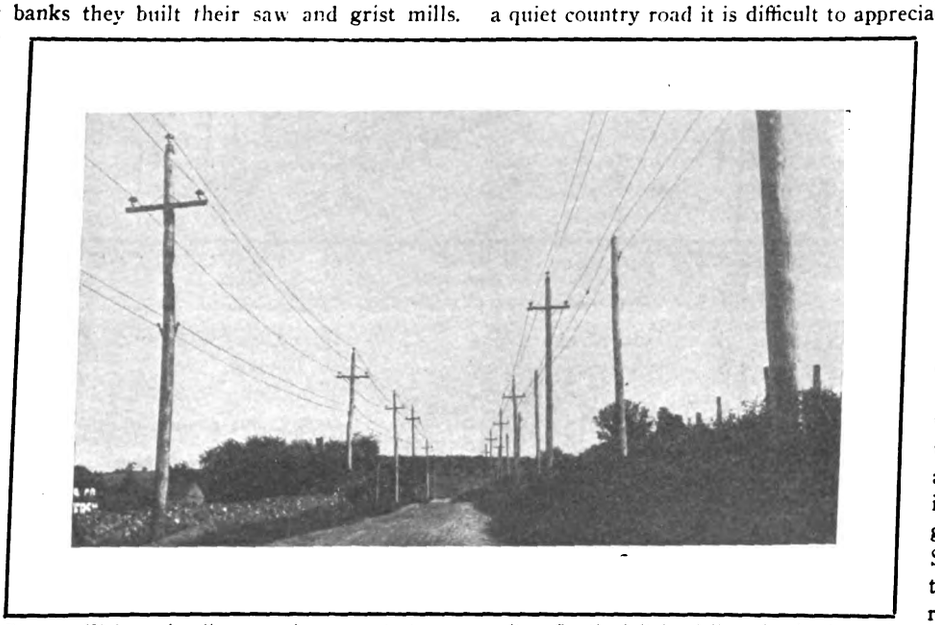

Fig. 1. High tension line, carrying current at 33,000 volts. On the left hand line of poles is a private telephone line used by the power company.

The introduction of the transmission of power by high voltage electric currents has caused the Telephone Company to develop special methods of construction for carrying its lines across the routes followed by the high tension lines. These circuits have recently been built for the conveyance of power to various centers of industry from generating plants located on the Housatonic and other rivers.

Among these power plants is one that transmits its energy from the Housatonic River near New Milford over a double line (Fig. 1), about sixty miles long to Waterbury and New Britain, to which cities it furnishes light and power to run the street railways. At these terminals are the usual step down transformer stations. This power is transmitted by a three-phase current at a voltage of 33,000. The wire used is seven-strand No. 6 aluminum, and the insulators are of the three petticoat porcelain variety. Originally there were glass insulators on the line, but the experiment was not a success. Thirty-three thousand volts is hard to confine; it is a veritable streak of lightning.

The genius who invented the method of splicing the high tension wires deserves mention here. He has evolved a combination of three ideas, the McIntyre sleeve, a pipe union and that dear old solid geometrical figure, the cone. The sleeve is, of course, single. Imagine two hollow aluminum cones, cylindrical near the base, one threaded right hand, the other left. These are strung onto the two ends to be spliced, the base of the cones towards the end of the seven strand. Smaller plain cones with a straight hole through their centers are now strung onto the central wire of the strand, which is riveted over the base of these cones. The strand is pulled back through the first mentioned cones, which now clasp the ends tightly. Then the union, which is a single cylinder of aluminum, threaded right and left at each end, is screwed on to both cones and the splice is complete. Try to think out how to splice a wire rope, without solder, without a sailor's splice, or a clumsy knot, making a joint that is electrically good, and see if you can improve on the above method.

As one follows those three seven-strand aluminum wires along a quiet country road it is difficult to appreciate the enormous force carried by them. It is asserted by the power people, however, that an arc fifteen feet long may be drawn from them. Some one else is welcome to try this interesting experiment, for we have passed the door bell, induction coil, experimental age.

In fact, the 33,000 volt line seems to work as well broken as when it is intact if the weather is good and wet. South of Washington, Conn., one very rainy day, the third wire of the power line broke down, one broken end dangling down the pole for a distance of about six feet, the other laying on the ground possibly sixty feet from the pole. At this point the Telephone Company had an underground crossing about 200 feet long. The conduit was of iron pipe, and in it was a single pair lead covered circular loom cable. This was burned in two about six inches from where it came out of the pipe. At the central office in Washington the manifestations of a heavy foreign current were noticed and the pair of wires in trouble were immediately short circuited. Later the power line break was reported to the telephone exchange, which in turn reported it to the power company in New Milford. The power company would not at first credit the report and, strange though it may seem, used the line with the broken third wire from 5:30 in the afternoon until about 7:15, when they switched over to the north line, and the telephone bells at the subscriber's stations stopped ringing after having dinned melodiously for nearly two hours.

The reader will notice that the pole at the left of the picture in Fig. 1 is charred between the cross arm and the brackets. When the power line was on glass one of the insulators snapped, the wire fell on the arm, neatly and quickly burned it in two, and charred the pole to the depth of an inch or two for a distance of six or eight feet down before the current could be thrown on to the other

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line. Thirty-three thousand volts loves old mother earth. As said before, this line furnishes the entire power for the lights, motors and street railways of the cities of Waterbury and New Britain, and these cities have 46,000 and 26,000 inhabitants, respectively.

In Fig. 1 the line on the brackets below the power line, on the left, is the Power Company's private telephone line. By shifting the brackets and crossing the wires it is transposed every three sections.

Normally the brackets are directly opposite each other on either side of the poles. When it is desired to transpose the wires they are placed perhaps twelve or eighteen inches apart, the right hand bracket over the left on one pole, under it on the next one. One wire of the metallic circuit then passes from the right of one pole to the left of the next, the other wire from the left of one pole to the right of the next. Thus the lines cross at every third pole.

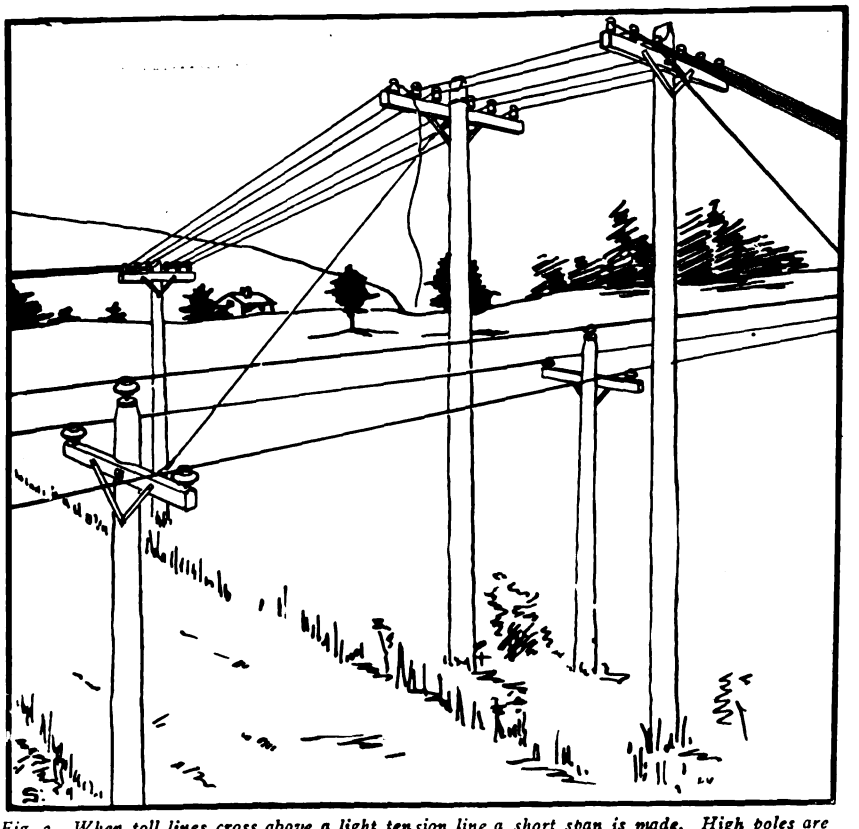

Fig. 2. When toll lines cross above a light tension line a short span is made. High poles are used, so that if a telephone wire should break the end could not reach the power company's conductors.

The superintendent of the Power Company says that there is an induced alternating current of 700 volts on this telephone line when they are running the high tension over it. In the graphic language of the day the Power Company's telephone line is a hot proposition. The writer was one day in the Telephone Company's Washington exchange when sparks began to fly between the carbons in a certain pair of wires. The heating coils were pulled out and after half an hour the trouble having come clear they were put back. The symptoms were those of a high resistance cross with an alternating electric light circuit. Later in the day about six miles from the office we found that one of the conduit foremen was getting ready to place this line underground where it crossed the high tension line. One of the men had cut a guy which slacked the telephone line down onto the Power Company's telephone line with the above result. A native told the foreman that his bell which was on the line had rung hard for quite a while. No bells on the line, however, were burned out.

Between the telephone instruments on the Power Company's wire and the line are repeating coils and fuses. Between the fuses and the line are helices of heavy wire, one helix in each side of the line, their purpose, of course, being to retard any foreign high voltage current.

The usual spark gap form of telephone protection was tried, copper blocks being used instead of carbons, but there was a constant discharge to the ground of the 700-volt induced current, and a consequent constant disturbance in the telephone. The power people were equal to the emergency. They inserted a single pole, single break and throw, knife switch in the ground wire and left it open.

One telephone man who read the preceding sentence remarked wonderingly that this would take the ground off the protector. When it was painstakingly explained to him that that was the correct answer and was what made it humorous, he was very much pleased and grateful.

That the influence of the high voltage circuit is far reaching was shown by the following incident which brought the fact forcibly home to the Telephone Company. Extending from the central office in New Milford are a few telephone lines which parallel the high tension lines for several miles, being as near to it as fifteen feet in some places. One day there was a snap and a crack in the main frame and three lines were found open. The trouble was finally located in an aerial cable which showed three pairs of open conductors in spite of the fact that the cable terminals were provided with the usual fuse and carbon protection. The cause of the above trouble was at first perplexing to the telephone men, for the day was clear and there was absolutely no sign of any atmospheric electrical disturbance. Later it developed that the discharge into the Telephone

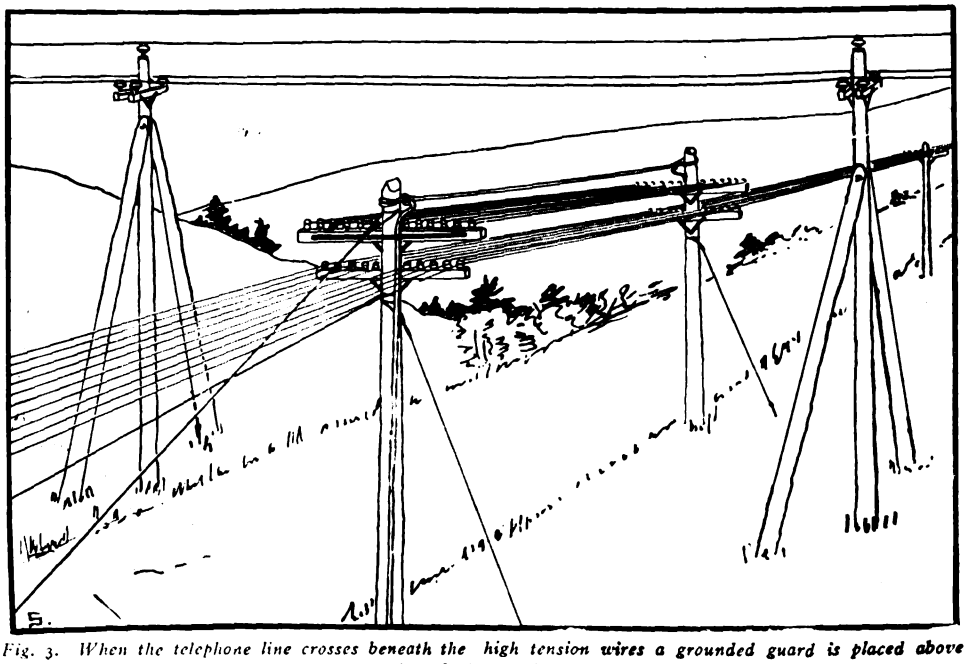

Fig. 3. When the telephone line crosses beneath the high tension wires a grounded guard is placed above the telephone wires.

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Company's cable was coincident with a person's touching one of the incoming power wires at the Waterbury transformer house. This, of course, threw a ground on the power wires, and some of the telephone wires were then within their influence. Normally, a section of the field of force surrounding the three phase line might be represented by a trefoil, the center of each leaf being a section of one of the high tension wires. When the line is grounded the field of force is suddenly enlarged, extending then from the line to the earth, and bringing within its influence any unfortunate telephone wires that are too near. Although not pertinent to this article, it may be of interest to the reader to know that the inquisitive person who felt of the high tension circuit in the Waterbury transformer house was not killed.

Now, a mile of 25 pair 22 gauge aerial cable in the air and spliced up is worth about $700, or $28 per pair of conductors. A loss of three pairs in that cable means a depreciation of 12 per cent. or $84. Plainly, the Telephone Company can afford to spend a few dollars to prevent such depreciation.

There are several high tension lines in the State of Connecticut of various voltages and the lines of the Telephone Company cross them no less than 65 times.

Some provision out of the ordinary should be made when it is necessary for telephone circuits to cross high tension lines, both as a protection to the telephone plant and to prevent loss of service to subscribers. Certain conditions should be fulfilled in case of a break in either type of circuit, telephone or high tension. If possible, they should not touch at all after a break. This condition would leave them in practically the same electrical relation to one another as they were before. If this condition could not be fulfilled, artificial means should be constructed to so damage the falling circuit that it would shortly be beyond harming itself or its neighbor. Still a third method would suggest itself to any thoughtful engineer, that of introducing insulated or grounded protection of some kind about the under circuits.

Let us start with the electrically self-evident truth that our telephone high tension crossings should be made at right angles. Fig. 2 shows what might be called the ideal way to make these cross overs. In it, we simply set two poles of the line crossing over as near to the line it crosses as we can. These poles should be so high that if a wire of the span breaks it will swing clear of the line under it. In the drawing is shown a wire broken and swinging clear. The insulators on the arms of the two high telephone poles should be of the transposition type and the cross over span and line each way should be dead ended on them. The line wires should then be sleeved around the glass. This guards against the span slacking down on account of a break on either side of it.

One designer proposes grounding the arms and pins of the high tension lines on each side of the crossing, when the high tension line crosses the telephone line. The theory of this is very pretty, but it does not take into consideration the necessity of obtaining the permission of the Power Company to put it into practice. One can imagine the enthusiasm with which such a proposal would be received by a company maintaining a 33,000 volt transmission line, which to avoid metallic guys is braced.

Unfortunately, however, this crossing shown in Fig. 2 is frequently impracticable. Maybe poles cannot be set near together on account of highways or railroads. Perhaps the grade of the line is such as to call for impossibly high or expensive poles. In Fig. 3 we guard against a break in a high tension line crossing over a telephone line. A special twelve-pin arm is placed on the poles on either side of the high tension line above the arms carrying the telephone wires. These arms are back-braced and a screen of No. 6 iron wire strung between them. Over the screen, from the tip of pole to pole is erected a steel hoisting rope which is grounded at the base of each pole. This rope is of a sufficient diameter to carry the high tension current to ground, in case of a cross, without itself being fused. Theoretically, should the high tension line slack down on to this crossing it would immediately burn in two on the grounded hoisting rope. The twelve-pin arm screen would prevent the broken wires from striking the telephone lines on their way to the ground. It would be very interesting to know what would actually happen should the above accident take place. The Telephone Company has not in the past had any experience with such a trouble and the strength of construction of both lines would not seem to invite it in the immediate future. One theoretical fault is, however, at once apparent with this crossing. The screen is insulated and by pony glass insulators. These would not offer any great opposition to the passage to ground of a 33,000 volt current. Consequently, should a high tension wire carrying the above voltage fall on such a sereen it would probably burn through it and the telephone wires below it with the greatest facility. The writer knows of one instance where a lineman on the top of a pole pulled up a telephone wire against a high tension line carrying 11,500 volts. The No. 12 telephone wire was burned in two instantly, and the man was unharmed. The telephone wire terminated in a coil that lay on the ground.

(To be continued.)

Secret Cord Circuits

By Albert DeVries.

As the old question of secrecy in telephone exchange systems seems to have been recently revived, it may perhaps be of some interest to the readers of The American Telephone Journal to note what has been done in Europe along this line.

The first system which could claim secrecy was the old Law system, which, under the name of the "call wire" system, was used in England by the National Telephone Company a long time ago. This system solves the question of secrecy in the simplest way, the operators being unable to connect their speaking instruments to the subscribers' lines, but receive their orders, to connect or disconnect, verbally through the call wire, which is permanently connected to the operator's receiver. As, however, the advantage of secrecy and simplicity in this system did not counterbalance its many drawbacks in other respects, it is now almost everywhere replaced by other systems. We believe the only exchange which still uses the call wire system is the older branch of the Glasgow Corporation exchanges.

Further there are systems using a plug switch for disconnecting the operators' instruments from the cord circuit as soon as the calling plug is lifted. This system, as well as a system with speaking keys which interrupt the talking circuit in the speaking position, similar to the Beard system, has been in use in England and Germany for some years. These systems are, however, not suitable for modern multiple systems with multiple jacks, because the devices in question do not prevent the operators from overhearing a conversation by plugging the multiple jack in the next section, even if the precaution is taken that a double break answering jack is used. Thus the said secret systems are mainly applicable to small private exchanges or exchanges using the express or similar systems, for which the secret device is undoubtedly of great value.

Of the secret systems in use in Europe there is one, invented by a Swedish telephone engineer, Mr. Bertil Brander, which seems to be a desirable solution of the problem of secrecy. This system enables the operator to listen in and hear whether the parties are talking, but at the same time prevents her from understanding the conversation by means of an automatic interrupter which cuts out the operator's receiver intermittently while she is listening. Mr. Brander describes his system as follows:

"It is a well-known fact that the general method of arranging the cord circuits in telephone systems in such a manner that the operator can easily overhear the conversation is a very undesirable and, particularly from a public point of view, objectionable feature. Various attempts have also been made to overcome

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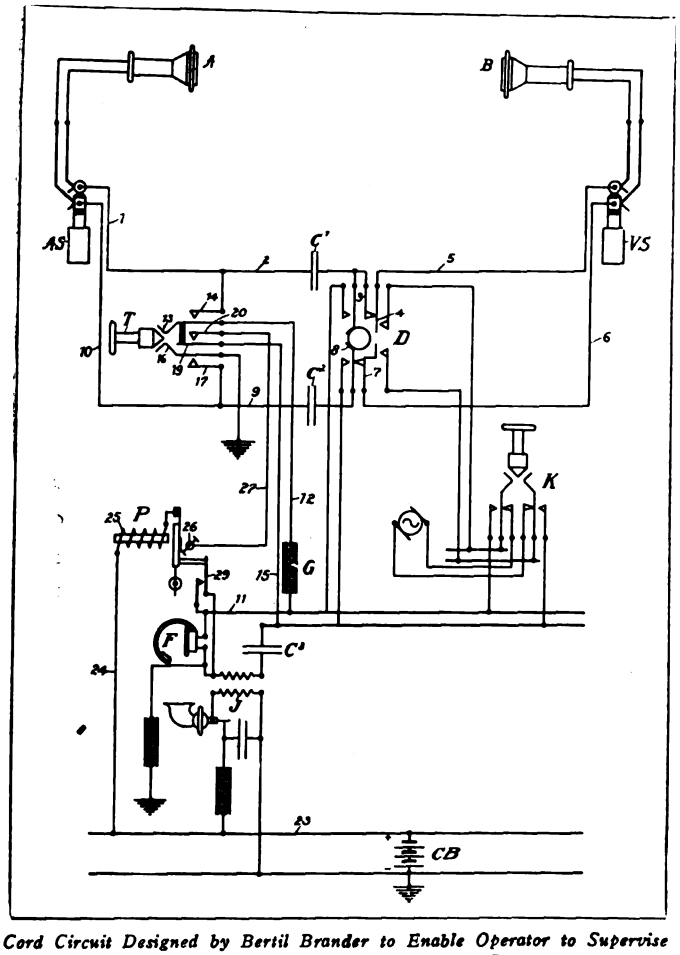
this drawback, but in most cases without success, owing to difficulties arising from the lessened supervision, particularly in systems without automatic supervisory signals. It is thus obvious that in every secret system where the operator has to *rely exclusively on signals* for the disconnection, the possibility of a connection being cut off either too soon or too late, is greater than if she is able to ascertain by listening whether the parties have finished or not.



Cord Circuit Designed by Bertil Brander to Enable Operator to Supervise While Preventing Her from Understanding Conversation.

"For these reasons I arrange the circuits so that the operator can ascertain, by listening, whether conversation is going on, but at the same time she is prevented from conceiving the content of the conversation by means of an automatic interrupter, which intermittently and with short intervals short circuits or cuts out the operator's receiver when she is listening, thus breaking up the sentences which come to the operator in fragments and resulting only in inarticulated sounds. The usual key for speaking and ringing is in this case arranged to interrupt the talking circuit when turned in the speaking position. This key can, of course, easily be arranged in such a manner that the operator can converse with either of the two subscribers, but not with both simultaneously.

"In carrying out the invention any suitable interrupter can be used for cutting out the receiver. A simple device is an electrically driven pendulum, similar to the familiar automatic pole changer used for ringing purpose in small exchanges. This pendulum need not be kept permanently in motion, but is preferably arranged in such a manner that it is set to work only while the operator is listening.

"The accompanying diagram indicates the arrangement of the automatic interrupter in connection with the cord circuit. The answering and calling plugs, AS, VS, are as usual connected by means of the flexible cords, and the combined speaking and ringing key D is arranged to interrupt the talking circuit in the answering position, as will be easily understood from the arrangement of the springs 7, 8, of the said key D. A separate listening key T is arranged similarly to listening keys in other systems, with the addition of the springs 19, 20. When the key T is pressed, the springs 19, 20 close a local circuit of the battery CB through the windings of the coils of the automatic interrupter P, which is provided with an oscillating pendulum arranged to close intermittently the contact between the springs 29, which are directly connected to the terminals of the operator's receiver F. A retardation coil G may be arranged in series with the receiver in the listening circuit, and in case of a common battery system a condenser or polarization cells C' are also inserted in the same circuit, in order to prevent any disturbing sound when the operator listens.

"The contact springs 29 are normally kept out of contact by the pendulum 30 of the interrupter, but if the listening key T is pressed the pendulum will be set in motion, causing the springs 29 to touch each other momentarily, and thus the receiver is intermittently short circuited so long as the key T is pressed.

"This listening device is of course applicable to all kinds of central exchange systems, sub-exchanges and intermediate stations, and it may even with advantage be used for intercommunicating telephone systems, to prevent a third party overhearing a conversation."

There is undoubtedly some truth in Mr. Brander's opinion that it is not altogether safe to rely only on the signals. For instance, in the Western Electric Company's system, if the clearing out relay would not close the contact properly for the shunt of the clearing out lamp, this lamp would burn during the conversation and cause the operator to turn the key and interrupt the conversation, whereas in the Brander system she would first press the listening key and then, in case there is no conversation going on, she would turn the speaking key and inquire if the subscribers have finished.

ORGANIZATION OF INDEPENDENT COMPANIES OF ARKANSAS COMPLETED.

By Charles F. Speed.

THE Independent companies of Arkansas have not only formed plans for establishing a complete and satisfactory toll service, but have perfected the organization of a State association. A meeting of Independent telephone companies was held at Little Rock to consider the questions of toll lines and a State association. Neither subject had received any definite attention heretofore, although the importance of both had been generally recognized. Sixteen companies sent representatives, and the meeting was called to order on February 12 with Dr. R. M. Drummond as chairman and John B. King secretary. The meeting was for business from the start, and committees were appointed to consider membership, by-laws and the subject of taking in those who are now connected with the Bell lines as members.

The committees made their reports at the hour set for the afternoon meeting. The committee on membership reported that all present desired to become members and were ready to sign the constitution and by-laws when adopted.

The committee on by-laws reported with a full constitution and by-laws, which, after being considered in detail, were adopted. The committee, whose duty it was to consider the subject of taking in those who were at present connected with the Bell lines, reported favorably to taking any one into the association who is now or who shall at any future time be engaged in the Independent telephone business in the State of Arkansas, and who would sign the constitution and by-laws. This permits all those who are now connected with the Bell lines to become members upon declaring their intention to become completely Independent.

The election of officers was then taken up and resulted as follows: Eugene Hale, Ozark, president; Dr. R. M. Drummond, Russellville, vice-president; John B. King, Texarkana, secretary, and P. C. Ewing, Little Rock, treasurer. The officers and Mr. O. W. McClintock, of Walnut Ridge, were made directors.

The president was directed to take the necessary steps to secure membership in the National-Interstate Telephone Association, and

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instructed to appoint a delegate to attend the meeting to be held in St. Louis in June.

At the evening meeting the question of toll lines was taken up, entering into every detail of the situation.

The question of toll lines was again taken up on the second day of the meeting, and resulted in an agreement to organize a long distance company, to be known as the Telegraphone Company of Arkansas, with the following officers and directors: W. D. Hearn, banker, Pine Bluff, president; L. Minor, banker, Newport, vice-president; Chas. F. Speed, Texarkana, secretary; W. B. Worthen, banker, Little Rock, treasurer; W. A. Latham, Fort Smith; J. S. Warren, Memphis; John B. King, Texarkana; Mack Hammett, Pine Bluff; W. M. Rickert, Little Rock, directors. The capital is $300,000, divided into 12,000 shares of $25 each.

All the Independent companies of the State have agreed to sell this stock to their subscribers, which assures the success of the undertaking right from the start, not only in the sale of stock, but in getting the business after the lines are built. With twelve thousand people directly interested in the success of the company it cannot fail to give the desired results.

The lines are to be built from Memphis to Fort Smith, and from Texarkana to the Missouri Line, where it is expected to get the connection with all the Northern Independent companies.

The Telegraphone Company does not propose to put up a foot of iron wire, making everything copper of a size not less than No. 10. Whatever lines are built are to be of the highest standard construction. In this way ample provision will be made for securing the highest quality of transmission on these lines, which may be required to carry messages over long distances. At the same time their durability will insure the smallest proportion of expense for maintenance.

CHARLES F. SPEED, Secretary of the Company which will furnish toll service in the South.

The meeting was attended by many prominent telephone men, including J. S. Warren, Memphis; W. P. Ritchie, Camden; P. C. Ewing, Little Rock; R. Brink Tyler, Louisville, Ky.; J. E. Tunis, Carlisle; Eugene Hale, Ozark; W. Arthur Latham, Fort Smith; Dr. Keith Hudson, Dahoma; Conrad Elsken, Paris; O. W. McClintock, Walnut Ridge; John B. King, Texarkana; Mack Hammett, Pine Bluff; I. Minor, Newport; E. C. Brewerоff, St. Louis; Edward Bowers, Dewitt, and Dr. R. M. Drummond, Russellville.

Economical Telephone Accounting and Filing Systems

ARTICLE IV.—OPERATORS' TOLL TICKETS AND RENTAL AND TOLL BILLS.

*By Charles C. Wilmot, Telephone Accountant.

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METHODS of taking care of the complex details of the long distance toll business and of handling the collection of toll and rental bills with the least amount of time, expense, and labor, are worthy of the most careful investigation and study on the part of all telephone officials. The subjects of operators' toll tickets, toll and rental bills and billing systems are of vital importance to every telephone manager in the country. False economy should not so influence the management that it will force the office manager to continue in old deep ruts of worn out methods.

The accompanying reproductions of copyrighted forms for operators' toll tickets for "In," "Out," and "Through" messages have stood the practical test of actual service in many exchanges. All the information necessary for recording and billing a toll message is fully provided for, as well as space for the use of a "Calculagraph" in recording elapsed time. The size of this form is 3½ x 5 inches.

These forms should be printed on a fair quality of paper, of a different color for each form, which will give a good legible record for the use of day or night operators. It is poor policy to overtax the eyesight and time of operators by using cheap thin paper and poor printing.

Form 10

Fort Worth Long Distance Telephone Co. **IN**

Date_____190__ Phone No._____
From _____
Party Talking_____
At_____
To Whom_____
Party Wanted_____
Authorized by_____
Rec'd_____M. | Minutes _____
By _____ Opr. | Toll _____
Began_____M. | Messenger_____
Ended_____M. | Total _____
Line No. _____
Remarks _____

Form 11

Citizens Telephone Co. **OUT**

Date_____190__ Phone No._____
Subscriber _____
Party Talking_____
Authorized by_____
To Whom_____
Party Wanted_____
At_____
Rec'd_____M. | Minutes _____
By Rec. Opr._____ | Toll _____
Sent____M.____Opr. | Messenger_____
Began_____M. | Total _____
Ended_____M. Line No._____
Remarks _____

Form 12

THROUGH

Date_____190__ Ticket No._____
From _____
At_____
To_____
At_____
Rec'd_____M. | Sent _____M.
By_____Opr. | By_____Opr.
Line No._____ | Line No._____
Remarks _____

Fig. 11. Operators' tickets for In, Out, and Through business. These tickets are 3½ x 5 inches in size.

*Editor's Note.—Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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It will be noticed that the information on these forms is entered in the natural order of the usual method of receiving details for calls, and also arranged to expedite the work of bill clerks. These tickets should be sorted by telephone number and arranged in consecutive order. This classification should be done by a night operator, so that the billing clerk can proceed each morning to bill the charges of the previous day and night messages. The subject of an economical and quick reference method of filing of toll tickets will be covered in a later article.

In Fig. 13 is shown a form, No. G-84, for toll bills, for use in small exchanges. Bills are to be made out with an indelible pencil or stub pen and carbon sheet, thus giving a bill for subscriber and a carbon copy for the office record. Collector's coupons are to be torn off of the original bill and turned in to the cashier with the cash by the collector, or by the office clerk who takes the money. Each line of a bill is numbered for the convenience of the subscriber or collector in telephoning or writing

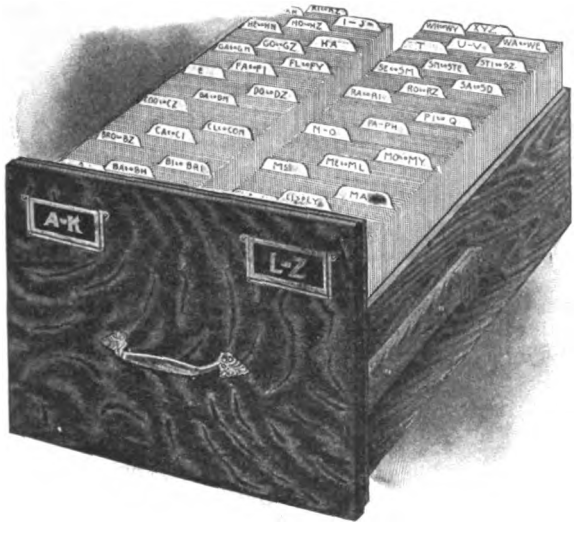


Fig. 12. The vertical system of filing toll bills, as shown in this illustration, is a time-saver.

in to the office regarding a disputed charge. The duplicate portion of the bill can be made with stubs wide enough to be punched for filing in a loose-leaf binder by telephone number or alphabetical arrangement. The vertical system of filing, as shown in Fig. 12 is strongly advocated. Sheets in this system should be arranged by telephone numbers between stiff cardboard guide cards in preference to an alphabetical arrangement. This method, with a numbered guide card for every 10th number, will be found to save time in making out the current month's bills, which should be charged up daily, as well as in filing the carbon copies after the originals have been torn off and delivered. In small, or branch exchanges, monthly toll bills can be posted directly from these duplicate bills to the "Monthly toll charges report," form No. G-76 shown in the previous article, on "Branch exchange reports."

(To be continued.)

POOR BELL SERVICE AT SEATTLE CAUSES PEOPLE TO UNITE IN THROWING OUT INSTRUMENTS.

NOTICES to the number of over a thousand on the first day, followed by hundreds of others signed by the leading business and professional men of Seattle, Wash., demand the removal of Sunset telephones as the result of a determination made at a mass meeting on Feb. 21.

The report of the investigating committee at the mass meeting, embodying the results of the committee's investigations of the local telephone situation, presented by W. T. Dovell, was a severe arraignment of the service the Bell company has given to Seattle for years past. He said:

"I am here to report to you the condition in the telephone systems as the committee in charge has found them. I shall call attention to what we believe, and to what Seattle citizens believe, are abuses of the system. One of these is the necessity we are under of using and of paying for two entirely different telephones.

"Now we believe that payment for one telephone is enough. The question is, which telephone shall we choose?

"During the past few years it is a notorious fact that the Sunset service has been inadequate and inefficient. This is not the time for the telephone management to apologize. It will not do to say that the growth of the city has been so great as to outstrip the telephone service, when at the same time another telephone company has put in many more telephones and given a complete and efficient service. We have nothing against the Sunset management. It is a question of discarding the one that has not given satisfactory service or the one that has given fair treatment and fair prices.

"The people must pledge themselves to take out one telephone, and, manifestly, that must be the Sunset.

"I am advised that the Independent company is prepared to install at once four to six thousand telephones. By the first of next August all those who desire to change can get the Independent. By the first of next year we could supplant every Sunset telephone in the city. The Independent now has made its long-distance connections certain.

"The suggestion I offer is this: Let every person present sign to-night a notice to the Sunset Telephone Company to remove its telephone by the 1st of August. The removal slips read as follows:

"Seattle, Feb. 21, 1906.

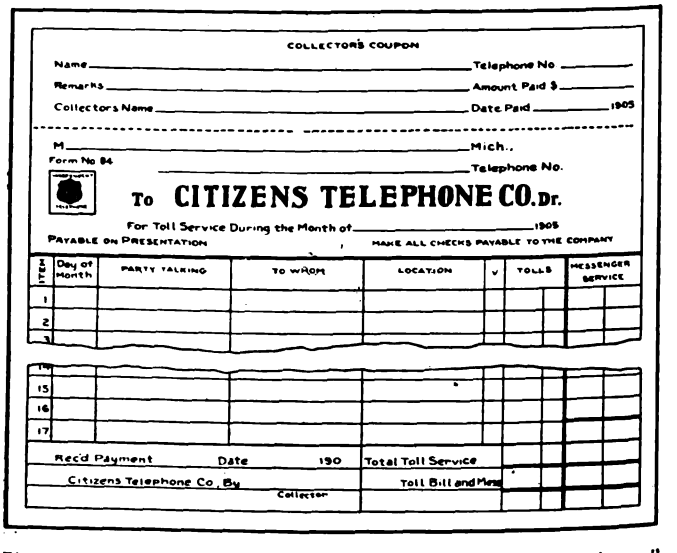
"Sunset Telephone and Telegraph Company, Seattle, Wash.—Gentlemen: On August 1, 1906, please remove my Sunset telephone, which number is now ———— street, Seattle, Wash., and oblige,

"....."

The Independent system was praised for fair play and good management, and the whole tenor of the committee's report was overwhelmingly in favor of the Independent as against the older system.

MISSISSIPPI VALLEY COMPANY TO MAKE IMPORTANT IMPROVEMENTS.

PLANS are now being considered which have for their object extensive improvements in the system of the Mississippi Valley Telephone Company. A meeting of the officials was held recently at Burlington, Ia., at which W. H. Taylor, representative of John E. Andrus, of Yonkers, N. Y.; S. S. Thorpe,


COLLECTOR'S COUPON

Name _____ Telephone No _____

Remarks _____ Amount Paid $ _____

Collector's Name _____ Date Paid _____ 1905

M _____ Mich.,

Form No 84 _____ Telephone No.

To CITIZENS TELEPHONE CO. Dr.

For Toll Service During the Month of _____ 1905

PAYABLE ON PRESENTATION MAKE ALL CHECKS PAYABLE TO THE COMPANY

ITEM	Day of Month	PARTY TALKING	TO WHOM	LOCATION	V	TOLLS	MESSENGER SERVICE
1							
2							
3							
14							
15							
16							
17							

Rec'd Payment _____ Date _____ 190 Total Toll Service

Citizens Telephone Co. By _____ Collector Toll Bill and Mess

Fig. 13. Form No. G—84, for toll bills. This form to be used in small exchanges.

of Minneapolis, president; Thomas Peebles, Minneapolis, treasurer; R. P. Purchase, local manager, and several engineers were present.

The underground cable system at Burlington will be greatly extended and the exchange rebuilt to handle 2,000 lines. Similar improvements will be made in Keokuk and other places.

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QUERIES

CAPACITY OF CONDENSER.—(663.)

Would a 4 microfarad condenser in a telephone receiver circuit give better results than one of 2 m. f. capacity? J. W. N.

THE use of a 4 m. f. condenser in a receiver circuit would produce very slightly better results than would one of the lower capacity. The function of the condenser is chiefly to keep direct current from passing through the receiver. Its disadvantage is its resistance to alternating current. The amount of this resistance for a condenser of a given capacity is determined by the frequency of alternations. For voice frequencies in a 2 m. f. condenser the resistance is about 50 ohms. This figure is so small when compared with the total resistance of the circuit including the receiver and induction coil at the subscriber's station and the repeating or retardation coil at the central office that a 4 m. f. condenser, although having approximately one-half the resistance of one of 2 m. f. capacity, does not make sufficient improvement to be commercially worth while.

REPEATING COIL IN NOISY LINE.—(664.)

How does a repeating coil cure a noisy line? J. W. N.

A REPEATING coil separates one section of a line conductively from the other, and prevents leakage or inductive disturbances in one part from finding a path to ground in the other. Its use is beneficial only in cases where a part of the line which is well balanced and well transposed, but subject to some electrical disturbance which raises the potential of both wires, is connected to a portion which is not so exposed to the external cause of a rise or variation in potential, and which is unbalanced through partial grounds or otherwise. In this case the passage of a varying current over the wires is due to the unbalanced condition of the whole circuit which is the result of poor balance in one of its parts. As the presence of foreign potential in equal amounts upon both wires of a well balanced pair, and likewise the presence of slight grounds upon wires which are not otherwise subject to external influence, is not usually sufficient to produce a noise in the receivers, the separation of the two parts of the line will bring about some improvement. It should be noted, however, that the reduction in the amount of noise is accompanied by a diminished efficiency both in ringing and in transmission, and the use of a repeating coil is to be considered only as a makeshift. The proper remedy is to clear the line from the disturbing influence.

BRANCH EXCHANGE TRANSMISSION.—(665.)

Would a 500 ohm coil across a cord circuit of a branch exchange interfere with the transmission? J. W. N.

A 500-ohm non-inductive resistance would seriously shunt transmission in accordance with Ohm's law. A 500-ohm inductive coil, provided with a continuous iron core in order to give as great an inductance as possible, when properly wound does not produce sufficient effect to be appreciable from a commercial standpoint. The loss is probably not greater than 3 per cent.

HOLDING COIL.—(666.)

Which would give the best results, a coil of plain resistance or a retardation coil, when placed across a cord circuit as a holding coil? J. W. N.

IT depends on what is to be done while the holding coil is on the line. If the coil is to be on during communication it should be inductive, in order to offer the least shunt to the transmission current. If not it may be non-inductive.

LONG DISTANCE TRANSMISSION.—(667.)

Why has communication across the continent never been established? J. W. N.

FOR two reasons. The first is that the amount of business would not pay returns on the tremendous investment necessary for the building of the lines. The second is that if the lines were built the current waves would be so distorted that speech could not be intelligibly transmitted over such long lines.

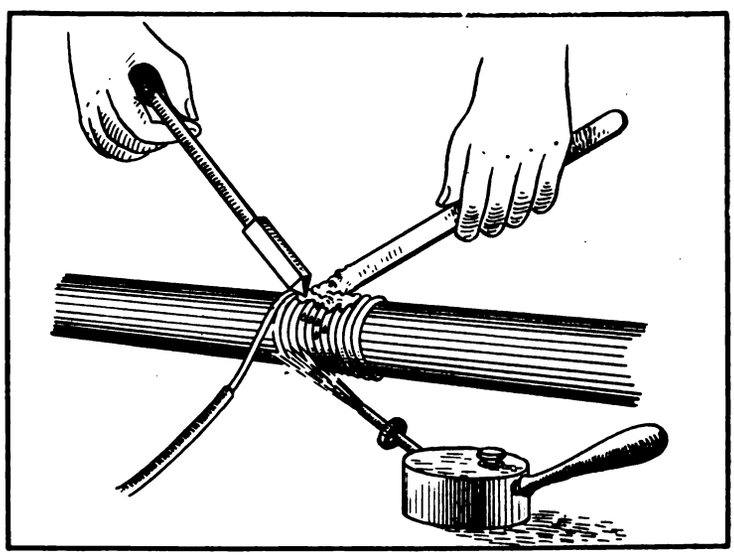

Fig. 668.

BATTERY GROUND CONNECTION.—(668.)

I notice in your issue of February 10th you say that central office batteries should be grounded. Will you please describe the method of making a ground connection? R. W. A.

ON storage batteries of the tank type a copper lug should be burned into the positive terminal bus bar of the battery, and the ground connection should be made by means of this lug. No. O wire should be run to the nearest available good ground. The best ground is obtained on a water pipe connected to the street mains. The next best thing is a gas main, with the ground connection made between the meter and the street. If neither of these is available, a buried ground may be used. This should preferably consist of a coil of buried wire having a great many turns, say about one hundred feet of wire, loosely coiled up. This coil should be placed in a hole deep enough to reach permanently moist earth. It is well to pack the bottom of the hole to the depth of an inch or two with finely divided coke. In this way a good ground is certain to be obtained.

To make a ground connection on a water pipe the wire, beginning at the point where it reaches the pipe, should have the insulation removed, and the surface of the copper should be scraped until it is clean and bright. The surface of the pipe at the point where the wire is to be wrapped on it should be filed until it is clean and bright over the whole area to be covered by the wrappings. The surface of both the wire and the pipe should then be thoroughly covered with soldering paste. The wire is then wrapped tightly around the pipe for ten or twelve turns. The next process is the soldering, and for this it is necessary to use not only a large, well heated soldering copper, but also to keep the flame of a small blow torch applied constantly upon the surface to be soldered (Fig. 668). In this way the pipe and wire are kept thoroughly heated, and no attempts should be made to apply the solder until it will melt when touched to the wire, without the aid of the soldering copper. The solder should be spread with the copper, and care should be taken that every portion of the wire is thoroughly sweated to the pipe.

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THE EDITOR'S PAGE

RECENT PATENT DECISIONS.

DECISIONS against the Bell interests in two recent patent cases relating to circuits should be extremely gratifying to Independent telephone men. The failure to accomplish the object of these suits has a much wider significance than is involved in the mere attainment of a right on the part of the Independent operators to use the circuits which have caused the litigation. It is likely to act as a distinct damper upon the tendency to endeavor to restrict Independent development by this annoying form of litigation.

The patent suits instigated in the past by the Bell interests have had two distinct objects. One of these has been, of course, to limit the resources of the Independent manufacturers. There are certain well defined principles applying to the design of telephone circuits which must be followed to produce satisfactory results. As was so clearly pointed out in the opinion of the court, which we printed last week on the legal editor's page, some of these principles are matters of common knowledge to those skilled in the art of circuit design. While their successful combination into working circuits may involve a high degree of ingenuity such an adaptation of principles to practice is capable of being made, and is being carried on every day, by numerous designers. Where so many men, working with the same materials, are able to produce similar results, it is difficult to say where genuine invention begins. For this reason, the only method which has seemed to be available has been to assume proprietorship in the principles themselves, and it is this attempt which was made in the two instances recently decided.

This method of procedure strikingly suggests the mode of operation in the case of the original patent on the telephone. In this instance the right to the exclusive use of the instrument was granted before a single Bell telephone had ever transmitted a clearly articulated word. It was established in the subsequent litigation that the patent was granted solely on the strength of the inventor's claims based on a conviction that a successful instrument could be made on the lines laid down in the description. In this case the patent on the principle was sustained. In the two more recent cases, however, the attempts to secure the exclusive rights in the development of other principles involved in modern practice have most signally failed. This will result in much greater freedom to Independent manufacturers in the design of switchboard circuits.

Another and most important blow to the Bell interests lies in the injury which these decisions have done to one of the annoying arguments which have been used with the object of preventing the building of Independent plants. In times past the establishment of an Independent system has been the signal for the appearance of numerous articles in the press hinting at the dangers of adopting a system liable to be tied up by an injunction brought in the course of patent litigation. Such statements must necessarily weaken the confidence of prospective investors in the territory to be covered by the new company. As the Independent plants depend to so large an extent upon local capital, often obtained from persons who have neither the knowledge nor inclination for an investigation of such claims, the serious effect of such statements is evident. Moreover, they have been intended to discredit existing systems in the popular mind, by creating the impression that the Bell companies control patents which enable them to use systems capable of giving service immensely superior to that which can be obtained by the use of circuits and apparatus which do not conform to their designs. The decisions show conclusively that the field of circuit design is sufficiently open to allow the Independent manufacturers to use systems which conform to the highest standards of modern practice.

BRANCH EXCHANGE OPERATING.

SUCCESSFUL service to private branch exchanges requires the careful completion of calls by the branch exchange operator. Inasmuch as this class of operating is seldom completely under the control of the telephone companies which establish the main connections the supervision of this service presents numerous special difficulties.

In small branch exchanges the switchboard is frequently cared for by an operator who is not continuously engaged in the work of handling telephone connections. As the companies using this class of service are usually anxious to obtain the fullest returns for the operator's salary she is given other duties which may presumably be carried on without interference with her work at the switchboard. The greatest care should be exercised in the choice of these secondary duties. It is evident that they should be of such a nature that they may be properly carried on without incurring the necessity of even a momentary absence from her position at the board. Any appliances necessary for their completion should be so arranged that their location on the switchboard is not necessary, and that the abandonment of the objects in hand at the moment a call is received can be accomplished without delay. Above all things it is essential that the operator should be thoroughly drilled in the practice of giving first attention to telephone calls, and making all her other work most thoroughly subordinate to her regular duties. The delay caused by the double switching and double repeating of numbers involved in the handling of calls through a branch exchange is quite sufficient to cause some slight annoyance to the subscriber accustomed to quick service over lines leading directly to the person with whom he wishes to speak.

In addition to being a skilful telephone operator, trained to make connections quickly, the branch exchange attendant should be familiar not only with the business of the establishment in which she is employed, but with the duties of each member of the organization, and with the places in the building where each person is likely to be found when not located at his regular post. One of the principal causes of annoyance to the person who wishes to carry on by telephone a business transaction with a house whose organization is not familiar to him is the difficulty of getting in communication with the individual who is competent to talk on the matter in hand. Cases where a call is switched to one department only to meet with a reference to a second and even further are too frequent to cause surprise. These instances of poor service cause an annoyance to the telephone subscriber which is wholly out of proportion to the mere delay which he experiences. Inasmuch as each of these instances is a case of poor service which tends to discourage the use of the telephone on the part of the calling party, and of the extension of the branch exchange system generally amongst those familiar with its difficulties, it is a matter of direct and substantial interest to the telephone company.

Any influence which the telephone company can bring to bear for the improvement of these conditions is sure to produce most satisfactory results. Such interference is justified by the company's interest in reducing the time necessary for its subscribers to complete a call and should improve the efficiency of the system.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HEIGHT OF WIRES ABOVE CROSSING IN NEW YORK.

Will you kindly answer the following questions in the Legal Department of your journal?

First: What is the lowest point at which wires may be lawfully maintained above the crown of the road where a line crosses the highway in the State of New York?

Second: What is the lowest point when a line is built inside of the ditch, and where no part of the line, either crossarms or wires, is above the highway?

Third: Are the requirements different for city, towns or country highways?

Fourth: Where the line is built along the highway and crosses a railroad which runs at right angles to the highway, at what height can the lowest wire be? Is this height regulated by law or the railroad company? G. N.

THIS whole matter is not governed by statute, but rests in each case upon what would be reasonable under the particular circumstances involved. A telephone company is under obligation to string its wires at such a height in crossing the highway and building inside the ditch along city, town or country highways, as will avoid accidents of all kinds. This height it must determine for itself at its own risk, except where local municipal authorities have passed their own regulations. In such case these regulations must of course be complied with. In building over a railroad track at a highway crossing, the height is regulated by the railroad company, because in the State of New York the use of a public highway for the construction of a telephone line is an additional servitude, and entitles the abutting owner to compensation. Eells v. American Telephone & Telegraph Company, 143 N. Y. 133; 38 N. E. 202. The consent of the abutting owner is therefore necessary, and at a point where a public highway crosses the right of way of a railroad company the latter occupies the position of abutting owner.

SERVICE OF PAPERS OVER TELEPHONE LINE IN OKLAHOMA.

IN a number of Oklahoma counties the rural telephone lines are used at court times for serving subpoenas, summoning jurors and witnesses and other court business which would otherwise necessitate long and tedious drives for the officers. A law passed by the last Oklahoma Legislature legalizes the service of paper by that method. It is also of advantage to the farmer as well as the court official at court time, as the man who has been summoned as a juror or witness and is kept waiting around for his case to come up can call up his home several times a day and give personal directions for the conduct of affairs on the farm.

WHAT IS A PUBLIC USE?

A BILL in equity was filed by Joseph C. Brown against Amos F. Gerald and others, praying for an injunction to restrain the defendants from erecting a line of poles and wires across the plaintiff's farm in Benton, Kennebec county, Maine. The defendants admitted an intention to erect the line of poles and wires, but claimed they had a right to do so under the charter of an electric and power company, in the exercise of the right of eminent domain. By its charter the company was empowered to manufacture, generate, sell, distribute and supply electricity for lighting, heating, traction, manufacturing or mechanical purposes, but the company could not use the electricity for these purposes on its own account. The court held that the acts enumerated did not constitute a public use for which private property might be taken against the will of the owner. It decided that such a corporation does not, by accepting the provisions of its charter, become a quasi public corporation and does not thereby become invested with the right to exercise the power of eminent domain. Defining a public use, it was stated that that only can be considered a public use where the government is supplying its own needs, or is furnishing facilities for its citizens in regard to those matters of public necessity, convenience or welfare, which, on account of their peculiar character and the difficulty or impossibility of making provisions for them otherwise, it is alike proper, useful and needful for the government to provide. Brown v. Gerald, 61 Atlantic, 785.

TELEPHONE COMPANIES AS COMMON CARRIERS OF NEWS.

Can you cite us any cases that apply to telephone companies as common carriers of news? We own a line to a neighboring exchange. They refuse to connect with us on any terms. We can call them over the toll wires of another company, but all our calls are refused. The reason for this discontinuation is that they are in sympathy with an exchange in our town with which we are in competition. Is there a legal remedy for our difficulty? R. L. P.

THE following cases hold that telephone companies are common carriers of news: Hockett v. State, 105 Ind. 250; Central Company v. Swoveland, 14 Ind. App. 341; Cumberland Telephone & Telegraph Company v. Hendon, 71 S. W. 435; State v. Nebraska Telephone Company, 22 N. W. 237; Central Company v. Fehring, 146 Ind. 189; Haber, Blum, Block Hat Company v. Southern Bell Telephone Company (Ga.) 45 S. E. 696; Phillips v. Southwestern Company (Ark.), 81 S. W. 605.

The cases do not yet go far enough to enable one to say with confidence that one telephone company can compel another telephone company to connect with it. On this subject see Campbellsville Company v. Lebannon Company, 80 S. W. 1114; People v. Central Company, 58 N. Y. Supplement 221; 53 N. Y. Supp. 574; People v. Hudson River Telephone Company, 19 Abb (N. Y.) 466; Shephard v. Telephone Company (N. Y.), 38 Hun. 338.

MAY ENTER ON ANOTHER COMPANY'S POLES.

IN the injunction proceedings instituted by the borough of Washington, Pa., against the State Mutual Telephone Company, which, after failure to get a franchise, came into the borough without a franchise over the poles of another company by mutual agreement, the court has decided that the company had a perfect right to do so. It was strongly contended by the borough solicitor that the company had no right to enter the borough without having first secured a franchise, but the company asserted that it had a right to enter providing it came by common consent over the poles belonging to another company. The court held that the act of March 19, 1903, allows any telephone company to use poles of another company which have already been erected with the consent of the borough authorities. The company already in the borough under a general ordinance not limiting the number of wires that it can string on its poles, can contract to allow an outside company to run wires on its poles without asking the consent of the borough. Injunction was accordingly refused.

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IN THE OPERATING FIELD

SITUATION AT EVANSVILLE, IND., DEVELOPS ADDITIONAL INTERESTING FEATURES.

THE Retail Merchants' Association, of Evansville, has entered a vigorous protest against the Council granting a new franchise, or ratifying the action of the Board of Public Works in granting a franchise to the Cumberland Telephone Company. The merchants charge that an effort is being made to force the Cumberland franchise through in defiance of objections or other interests. The Merchants' Association is favorable to an Independent Company and its protest to the Council sets out the fact that the Citizens' Telephone Company filed an application for a franchise three weeks before the Cumberland filed any application, and that nothing had been done with it. The protest also pointed out that the Citizens' franchise was similar to the Cumberland's franchise in every way, except that it offered a lower rate to subscribers. Mayor Boehme is said to be favorable to the Cumberland, but there promises to be a warm time in Evansville if the Independents are not given a fair consideration. The Evansville situation will not be cleared up until the Independents are given a foothold. The people are demanding that they be let in and then, as they say, "Rates will take care of themselves."

GROWING BUSINESS OF INDEPENDENT TELEPHONE COMPANY IN TEXAS.

TEXAS, the state of magnificent distances, is becoming noted for the extension and rapid development of Independent systems. An excellent example of this growth is furnished by the People's Home Telephone Company, of Gainesville. This system, although in its infancy, has shown remarkable vitality. All the prominent business men and farmers in the surrounding county are subscribers, and parties are always on the waiting list, although the company is doing all in its power to extend the lines to meet the growing demand for its high class service. In and around Gainesville it now has upwards of 675 subscribers and to the branch exchange at Valley View there are connected about 60 others. Its toll and long distance service is very extensive, thirty-two of the most important towns being listed in the directory and besides these there are a number of less important points which can be reached. Fort Worth, Dallas, Paris, Sherman, Weatherford, Bonham, Arlington, etc., are points with which a considerable toll traffic is exchanged, and the business is being rapidly expanded, owing to the excellent service rendered. The rates are for business, $2.50; residence, $1.50; and extension telephones, $1.00 per month in Gainesville and business, $2.50; residence, direct wire, $1.25; and four party, $1.00 per month in Valley View. The plant is common battery and of the latest type. In every respect the system is up to date, which is one reason for its very satisfactory growth.

KENTUCKY INDEPENDENT COMPANY REPORTS INCREASE IN INCOME DURING PAST YEAR.

AT the annual meeting of the stockholders of the Fayette Home Telephone Company, the annual reports showed very satisfactory improvements in every way during the past year. The income of the company for 1905 was $68,288.46, as against $59,599.73 for the year 1904, and over $3,500 of collectable bills were carried over from 1905. The company was enabled to improve the condition of its plant, and, after paying dividends on both its common and preferred stock, has a good balance to the credit of its surplus fund.

The estimate for the year 1906, based upon the business done during the month of December, 1905, was $71,204.20. The president of the company announced that with the same average increase of telephones and toll service he could confidently count upon an income for the ensuing year of $75,000.

The report of the growth of the plant showed that the company had 2,244 telephones in use upon January 1, and that the number of subscribers is steadily increasing. The principal business transacted at the stockholders' meeting was the election of a board of directors for the ensuing year, and the following gentlemen were elected:

John R. Allen, George A. Bain, Dr. David Barrow, Desha Breckinridge, F. A. Bullock, L. G. Cox, George K. Graves, Charles Kerr, John McClintock, W. K. Massie, C. C. Paterson, J. W. Porter, J. D. Purcell George S. Shanklin, John T. Shelby, John Skain, J. W. Stoll, all of Lexington; John L. Dunlap, Louisville; John M. Lassing, J. W. Bannon, Eminence, and John Y. Rout, Versailles.

The following officers were elected for the year 1906: George S. Shanklin, president; John T. Shelby, vice-president; J. W. Stoll, treasurer, and Charles Kerr, secretary.

MEETING OF THE SIXTH DISTRICT OF INDIANA INDEPENDENT TELEPHONE ASSOCIATION.

THE sixth district of the Indiana Independent Telephone Association, comprising Clay, Greene, Owen, Parke, Putnam, Sullivan, Franklin and Vigo counties, held its first meeting at Terre Haute on February 7. Earl B. Talbott of Linton, who is one of the vice-presidents of the State organization, and who is also president of the district association, presided.

The following officers were elected for the ensuing year: E. D. Talbott, president; E. G. Bush, Brazil, secretary-treasurer; C. R Duffin, Terre Haute, J. W. Weik, Greencastle, and J. G. H. Klingler, Brazil, were apointed a committee on by-laws. The following auxiliary committee from the respective counties was appointed: J. F. Slinkard, Greene County; W. Turpin, Putnam; W. W. Harbrough, Sullivan, Ind.; J. W. Atchison, Vigo County.

After perfecting the organization, the meeting was taken up with a discussion of general operating conditions throughout the district, according to a statement furnished by one of the officials. Reports from the companies represented showed that the Independent interests are in excellent condition.

C. S. Norton, secretary-treasurer of the State organization, was present and addressed the meeting on the conditions prevailing throughout the State. His report showed that in the entire State there are 200,000 Independent telephones in operation, which is seven times as many as operated by the opposition. The association adjourned to meet in three months at Brazil, Ind.

PLANS PROJECTED FOR NEW TOLL LINES TO ILLINOIS CITIES FROM PEORIA.

TOLL line service was the principal feature of a discussion of Independent men at a recent meeting in Peoria. E. R. Conklin, of the Inter-State Company, invited the representatives of the systems in the adjacent territory to Peoria to the conference. Among the men who responded were Messrs. James Barrett, of Pekin; Myers, of Washington; Bullock, of Eureka; Summers, of Metamora, and Fleming, of El Paso.

In the course of the meeting the growing use of Independent toll lines was discussed, and it became evident that the lines would have to be greatly extended to handle the new business. The Inter-State company is at present constructing a number of

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FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

WANTED

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POSITION WANTED—All-round man can take construction or switchboard work. Some experience with cable. Married, sober; 10 years in the work. Factory experience. Address L. F. Tate, R. F. D. No. 5, Attica, Ind. 554

WANTED—Position as manager, exchange 3,000 to 5,000 subscribers; eight years' experience in the Independent field; understand the telephone business from the ground up; competent and reliable. Can furnish adequate references as to qualifications, habits, etc. I will guarantee to "deliver the goods" in exchange management. Address Box 559, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 559

WANTED—Practical telephone man desires position as assistant superintendent or troubleman. Eleven years' experience. Best of references. Address Box 560, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 560

WANTED—Continued.

WANTED—An active partner with some money to put in a good paying telephone business. Owner is forced to take this action because of lack of capital to carry on rapidly expanding business. Address Box 543, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 543

WANTED—Position as manager. Have had 14 years' experience in all branches of the business from the ground up. Past eight years have managed and superintended construction. Married and temperate. Very best of recommendations. Address M., 2119 A, Cass avenue, St. Louis, Mo. 552

WANTED—By telephone manufacturing concern, competent telephone engineer, one who can design and construct apparatus. Fair salary to right man and excellent chance for advancement. Address Box 558, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 558

WANTED—Position as manager, superintendent or wire chief. Eleven years' experience; good, all-around telephonist. Can take complete charge of from 1,000 to 2,000 subscribers. Address G. W. J., manager Home Telephone Company, Uhrichsville, Ohio. 547

WANTED—A young man with a good electrical education and knowledge of telephone line construction. Should be familiar with locating new pole lines and transmission standards. Work located in Western Pennsylvania. No application considered unless age and salary expected are stated. Address Box 561, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 561

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lines out of Peoria which will be finished in the near future. One of the routes extends to Hannah City and Tivoli. Early in the spring a new lead will enter Elmwood and continue on through Yates City and Galesburg to Rock Island, where it will join the lines of the Iowa companies. The Independent business in the counties of Peoria, Woodford, Tazewell, Mason, Fulton, Knox, Stark and Marshall is naturally tributary to Peoria. It is to facilitate the business of the wholesale interests and the owners of the exchanges, especially in the smaller towns, that the meeting was held.

THE FLAG OF THE INDEPENDENTS STILL WAVES IN WASHINGTON, PENNSYLVANIA.

LAST July the State Mutual Telephone Company after being refused a franchise in Washington entered the borough on the poles of another company. The lines were cut down several times and as promptly repaired. In replacing the line over East Beau street a small American flag was attached to the line and Manager T. B. Lee declared that flag would not come down. It is there yet where it was erected. Judge McIlvaine has rendered a decision that the State Mutual was lawfully in the borough of Washington.

COMPARATIVE STATEMENT OF TELEPHONE SITUATION IN OHIO.

PRESIDENT BEAM of the Ohio Independent Telephone Association has prepared a comparative statement of the number of telephones in Ohio, both of the Independent systems and of the Bell system, by counties, which is very instructive.

		INDEPENDENT.				BELL.		
COUNTIES	COUNTY SEATS	Number of Telephones	Number of Exchanges	Number of Toll Stations	Number of Stockholders	Number of Telephones	Number of Exchanges	Number of Toll Stations
Adams	West Union	0	0	0	0	0	0	3
Allen	Lima	4,516	11	12	673	1,555	1	14
Ashland	Ashland	2,972	13	23	249	20	1	3
Ashtabula	Jefferson	3,636	7	24	398	557	3	11
Athens	Athens	2,950	1	10	586	750	1	6
Auglaize	Wapakoneta	2,009	7	6	200	0	0	8
Belmont	St. Clairsville	2,370	15	10	216	1,125	5	7
Brown	Georgetown	56	0	3	1	0	0	0
Butler	Hamilton	3,229	9	70	247	2,193	4	31
Carroll	Carrollton	582	11	20	155	15	2	5
Champaign	Urbana	2,653	10	20	176	0	0	1
Clark	Springfield	4,808	9	0	96	4,640	13	34
Clermont	Batavia	1,154	12	90	73	600	8	46
Clinton	Wilmington	2,081	6	17	24	450	5	7
Columbiana	Lisbon	3,481	18	22	204	1,887	8	9
Coshocton	Coshocton	1,635	6	15	241	550	4	8
Crawford	Bucyrus	1,200	4	11	50	200	1	0
Cuyahoga	Cleveland	20,273	17	32	1,104	20,164	14	25
Darke	Greenville	3,790	8	37	173	115	1	20
Defiance	Defiance	930	3	4	78	8	1	6
Delaware	Delaware	1,953	6	8	144	550	2	6
Erie	Sandusky	1,875	5	7	251	1,012	2	5
Fairfield	Lancaster	1,222	6	6	150	1,200	5	10
Fayette	Wash'gton C. H.	1,675	5	18	14	175	1	6
Franklin	Columbus	8,436	15	8	221	8,115	4	6
Fulton	Wauseon	2,568	10	26	158	2	0	8
Gallia	Gallipolis	850	1	5	57	150	1	5
Geauga	Chardon	2,460	13	25	439	0	0	24
Greene	Xenia	410	2	1	19	10	0	0
Guernsey	Cambridge	2,069	10	53	84	650	1	16
Totals,		87,852	240	583	6,481	46,693	88	330

The statement is made up to January 31. At the present time between 500 and 1,000 new telephones have undoubtedly been added to the Independent list, which is growing at the rate of about 500 per month.

The report will make a better showing if Hamilton County's 20,000 telephones are excluded, as the Independent companies have not been able to break into that field and consequently are not in competition with the Bell there. The list of telephones, exchanges, toll stations and stockholders in 30 counties, as shown by President Beam's compilation, is printed herewith. The remainder of the statement, which will be given in detail in a succeeding issue, shows that the Independent companies have in the entire State 227,271 telephones, 695 exchanges, 1,604 toll stations and 18,239 stockholders. The figures obtained for the Bell companies give as totals only 108,991 telephones, 219 exchanges and 842 toll stations.

CLEARING HOUSE COMPANY CHECKS TOLL ACCOUNTS IN IOWA.

TOLL line message business is checked and the earnings are apportioned amongst various Iowa companies by the Independent Clearing House Company, which was organized some time ago for this purpose. The clearing house has secured a suite of rooms at 410 Locust street, Boone, Ia., and has engaged Geo. T. Hewes as manager. Arrangements have been made with a large number of Iowa companies to have their business checked and arrangements are fast being made with others for this same service. The company is now actively engaged in this work.

TELEPHONE COMPANY MUST PAY FOR PRIVATE RIGHT OF WAY IN NEW YORK CITY.

IN a recent unanimous decision of the Appellate Division of the Supreme Court it was held that for every telephone wire strung over and on a person's property, without his consent or license, the New York Telephone Company is liable to the extent of $50 per wire annually. While this decision at present affects only Manhattan and Bronx boroughs, should it be sustained by the Court of Appeals it is likely that it will be extended to the remaining three boroughs of Brooklyn, Queens and Richmond.

This decision was rendered in the vigorously contested suit brought by Ratje Bunke against the New York Telephone Company to recover $200 damages for having strung wires across the roof of his house at No. 327 Pleasant avenue. It began in the Municipal Court, and has gone up by stages to the Appellate Division of the Supreme Court. The proceedings began January 8, 1904.

In deciding the matter the Appellate Division, through Justice Laughlin, all concurring, holds that the evidence was sufficient to show that the telephone company was the owner of the wires running over plaintiff's roof, and that the testimony of an expert that the value of a roof for the purpose of stringing wires was worth at least $100 a year was admissible. It also says that the claim of the telephone company that the wires in question were strung over the roof under a license granted by a prior owner of the property is of no avail as a defense, as, if there was such a license, it was terminated by the transfer of the property to the plaintiff.

Justice Laughlin sums up in this manner:

"It is said that the case is to be precedent for many others. The defendant (New York Telephone Company) has no right to invade private premises and attach its wires to roofs or chimneys without a license from the owner, and it has no right to maintain them after a change in ownership without further license."

When the enormous extent of the plant which is rendered liable to these charges is considered it will be seen that this decision is likely to bring about a substantial reduction in the profits of the New York Telephone Company.

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18	"	"	1	"	"
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28	"	"	1	"	"

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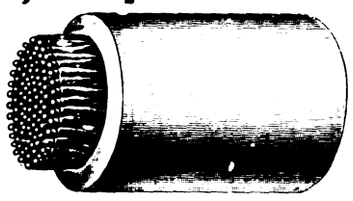

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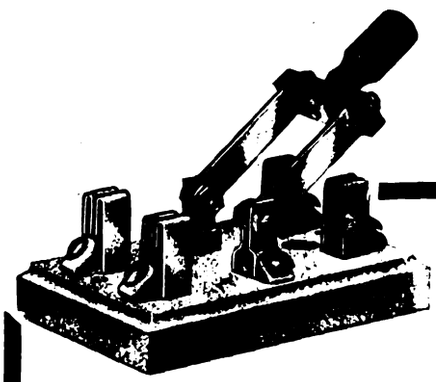

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TELEPHONE PATENTS

PARTY LINE SYSTEM.

Arthur F. Poole and Frank B. Hall, of Wheeling, West Virginia, patent (No. 810,345, dated Jan. 16, 1905; filed October 13, 1902; serial No. 127,113) a telephone party line system.

This invention deals with step by step selective apparatus and discloses improvements over former types. Thus the operation of the system is not dependent upon the strength of the selecting currents and the apparatus at each of the substations is operated individually instead of collectively, as is the usual practice.

To accomplish these results a special mechanism is designed which operates in conjunction with a metallic circuit. One side of the circuit is continuous, each substation being provided with a legged connection. The other side of the circuit is looped in to each of the substations and connected to the subscribers's selective apparatus. At each substation this loop is provided with a normally open contact. In the operation of the system these contacts are closed successively until the desired wires may be utilized in connection with a ground return or both wires may be used. On account of the complexity of the arrangements it will be impossible to describe the apparatus and its operation in the space at our disposal, and we would suggest that parties interested secure a copy of the patent.

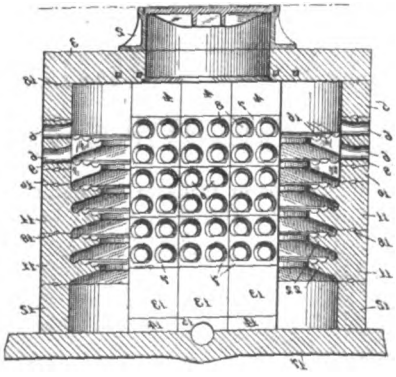
CROSS-ARM CONSTRUCTION.

Oliver C. Allen, Greenfield, Ind., patents (No. 811,895; dated Feb. 6, 1906; filed May 17, 1905; serial No. 260,768) a device for cross-arm construction.

The object of this invention is to provide an improved means for bracing double cross-arms. To accomplish this result the inventor employs a spacing and bracing device which is attached to the ends of the cross-arms. Two pairs of C-shaped members with the upper portions bent at right angles to the vertical part and sharpened into wedge-shaped points, are mounted upon a rod in such a manner that the pointed ends of each pair face each other. The adjustment for distance is accomplished by means of nuts which engage threaded portions of the rod. In application the device is slipped over the ends of the pair of double arms in a horizontal direction. The nuts are then tightened up and the sharp ends of the clamping members are forced into the cross-arms, holding them securely.

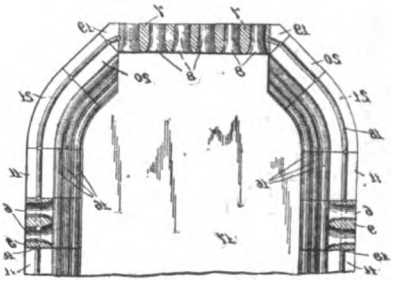
MANHOLE FOR CONDUITS.

Winfield A. Haller, New Orleans, La., and James W. Billingsley, Tivoli, N. Y., patent (No. 810,855; dated Jan. 23, 1906; filed



Feb. 21, 1905; serial No. 246,701) and assign to Edwin N. Sanderson, Brooklyn, N. Y., and others, a manhole for conduits and the like.

The object of this invention is to provide continuous resting places for cables in manholes and especially relates to concrete block construction. For this purpose the walls are built of blocks 11, which are provided with projectory shelves 22, having grooves 16 moulded therein for the purpose of supporting and isolating



each cable. Each of the blocks forming the manhole wall is provided with aligning grooves 18, to enable them to be aligned in both vertical and horizontal directions. In this way the whole structure may be tied together by ransome rods and suitable cement can be applied to fill the aligning holes. Inlet openings are shown at 8 in the form of multiple ducts. If necessary, lateral inlets can be provided at 6. 4, 5, 12, 13, 14 represent solid spacing blocks and 7, 9 the inlet or duct blocks.

RING-OFF DROPS RESTORING MECHANISM.

Ewing McLean, Greencastle, Ind. (patents Nos. 807,575; dated December 19, 1905; filed November 21; serial No. 233,663); a means for restoring ring-off drops on telephone switchboards. This the inventor accomplishes by a combination of levers actuated on the return of a plug to its socket in the plug shelf. A lever extending beneath the surface of the cord table has a hole bored in one end to form in effect a movable plug seat. When the cord is in a jack the rear portion of the lever is tilted down, but the return of the cord to its idle position causes this rear end to rise. In doing so it engages a piece attached to the lower edge of and projecting at a right angle from the shutter of the clearing out drop, which is designed to be mounted at the foot of the panel. Its further movement raises the shutter to the normal position.

POLICE SIGNALING SYSTEM.

Charles L. Foster and P. Kerr Higgins, Los Angeles, Cal., patent (No. 812,733; dated Feb. 13, 1906; filed July 14, 1904; serial No. 216,605) a police signaling system. The essential features of this invention consist of the employment of a system of relays which control lamp or other signals, either visual or audible, by means of which a police officer can be called to the nearest telephone patrol box on his route.

The signals are bridged on a circuit including a dynamo or other source of power to operate them which is open at the contacts of a relay. When it is found necessary to signal a policeman, the operator at the station manipulates switches which cause the lamp signal relay to close its contacts, thereby operating all the signals along the route of the called officer. When the policeman reaches a box and opens it, an automatic switch actuated by the door closes a circuit including a supervisory signal at the exchange, by means of which the operator is notified of the officer's presence at a patrol box. When it is desired to signal the exchange, the normal circuit is so arranged that when the door of a patrol box is opened a line signal is displayed. The operator answers by first manipulating a key which disconnects the line signal and connects the talking set in the circuit.

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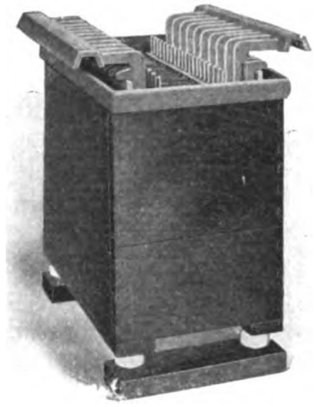

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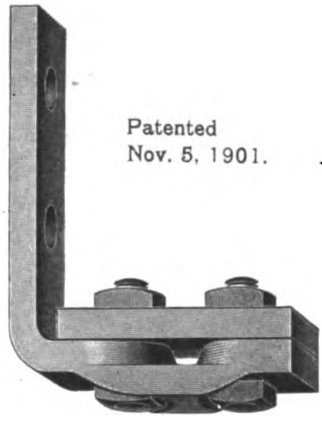

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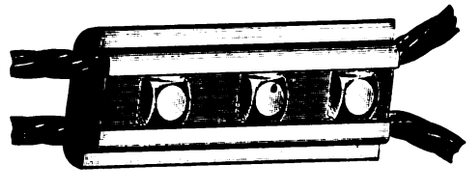

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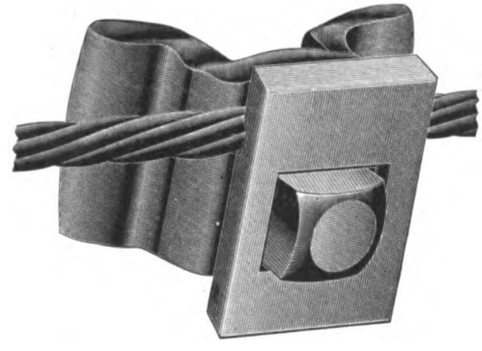

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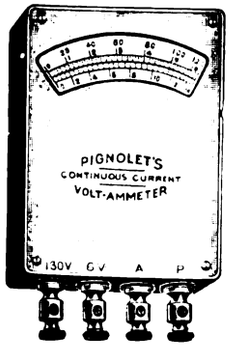

If you are not using a measuring instrument to test your lines, get one at once, as you will need it many times before the summer comes. It would be just as sensible for a grocer to try and sell sugar by guessing at its weight as it is for you to try to locate a fault in a line by the same method. PIGNOLET VOLT-AMMETERS are designed to give the best results required for testing purposes. They are not complicated nor do they require experts to operate them. Another point in their favor is their low cost. There is no instrument on the market which will give you as accurate results at anything near the price. Hadn't you better write for prices and further particulars? By buying one now you will save its cost many times over before you have had it a year.

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IN THE MANUFACTURING FIELD

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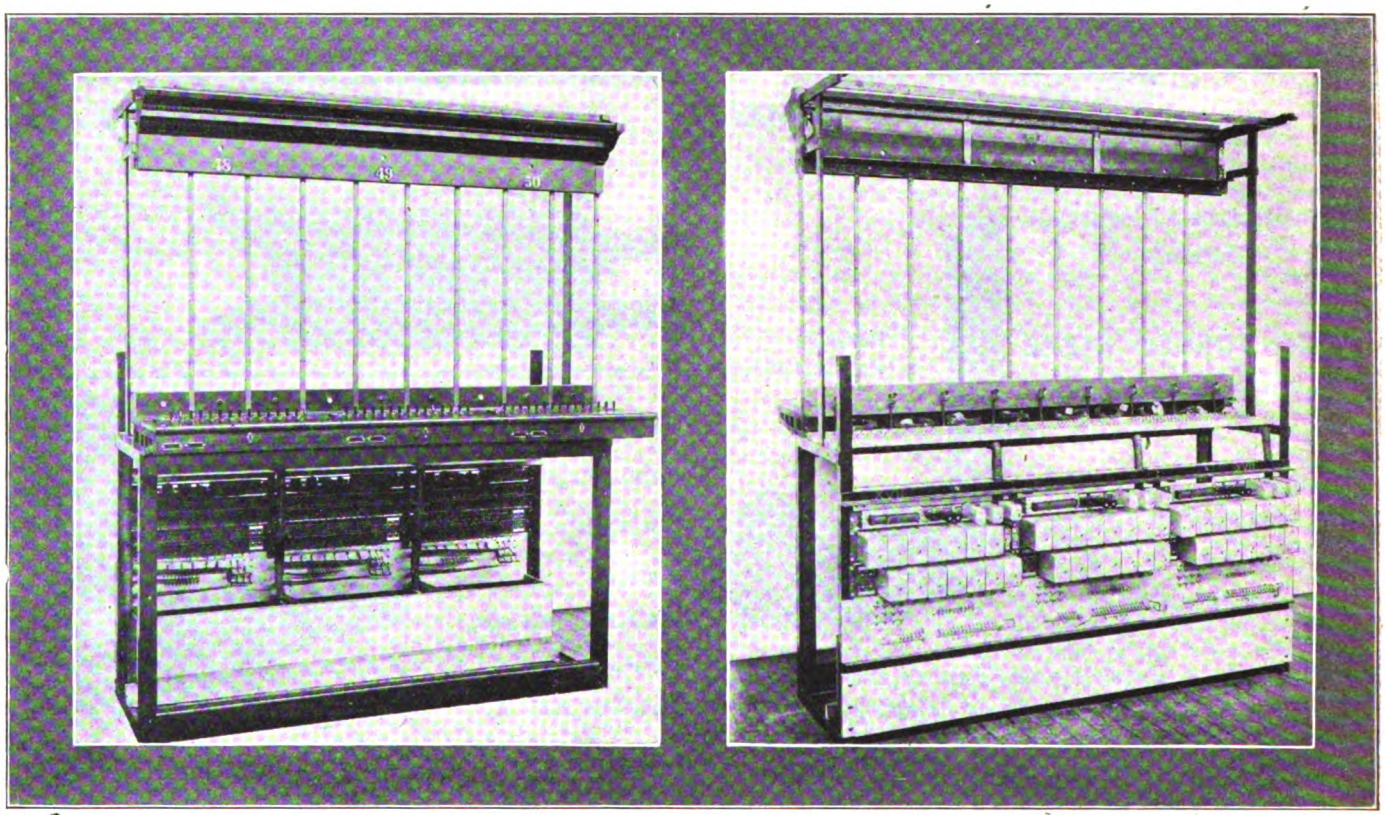
MODERN SWITCHBOARD FRAMEWORKS.

FRAMEWORKS for large switchboards must be so designed that all apparatus and wiring located upon them is readily accessible for removal or repairs, and, in addition to this, must have sufficient strength to support the heavy weight of relays, jacks and wiring with which they are loaded. Upon this page there are shown views of the front and rear of a switchboard section designed for the main office of the Independent Telephone Company at Syracuse, N. Y. This is one of eighteen similar sections, each of which has a capacity of 12,600 subscribers' multiple jacks, 360 outgoing trunk multiple jacks and 450 subscribers' answering jacks.



Front and Rear Views of Framework, 12,600 Line Section of Subscribers' Switchboard, Made by the Stromberg-Carlson Manufacturing Company.

In the rear of the switchboard provision is made for mounting the apparatus associated with the operator's talking set and the supervisory relays in the cord circuit. Below these relays is located the terminal board and all local wiring in the section is brought to this board. The wires terminate upon connecting lugs, which are stamped from sheet brass and carefully tinned where the wires are to be soldered. All local circuits of a particular class are grouped together, in order that the arrangement may not only be convenient for testing but provide for an economical arrangement of cabling. Multiple jacks are fastened to the uprights which rise between these two panels, and the method of fastening is such that any strip may be removed without disturbing any other strip. As all the local wiring in the section is run in while the frame is in the shop, the common wires which carry the battery current to the answering jacks are left coiled above the cord shelf. Thus, when the section is installed it is only necessary to run in the cabling with the jacks attached and solder on the common wires, which are already in place. In this way the amount of time and labor necessary for the installation of a section after it leaves the shop is reduced to a minimum.

Each operator's position is equipped with one of the latest type of operator's breast plate transmitter telephone sets and is also furnished with a complete supervisory pilot equipment, consisting of line pilot, disconnect pilot and ringing pilot lamps. The line pilot has a white opal lamp cap and indicates when a call comes in on an operator's position. The disconnect pilot, having a red opal lamp cap, is used in connection with the supervisory lamp in the calling subscriber's cord circuit. This lamp remains lighted after a calling subscriber has replaced his receiver or flashes if he works the hook in case he desires to signal the operator immediately after having made a call. The ringing pilot has a green opal lamp cap and indicates when an operator rings on a subscriber's line.

A special reflector is supported by standards inserted in the drilling above the position numbers, and this reflector, which runs the whole length of the switchboard, is so arranged as to provide for the correct distribution of light. These sections are made by the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y. The design is in accordance with the best lines of modern practice in the way of providing for economy of installation and convenience in maintenance, and the workmanship is of the highest quality.

THE FRENCH BATTERY COMPANY, of 69-75 Wells street, Chicago, is introducing a dry battery under the label "Fleur de Lis," which is being manufactured by a process never before utilized in this country and which is said to be giving results which are exceptional. The tests which these cells have been subjected to have brought the strongest endorsements from some of the leading electrical experts, and when the battery becomes widely known

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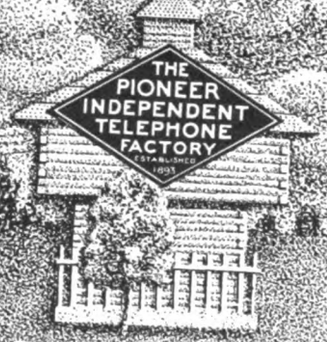

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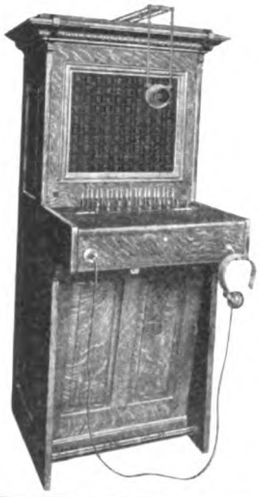

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IN THE MANUFACTURING FIELD

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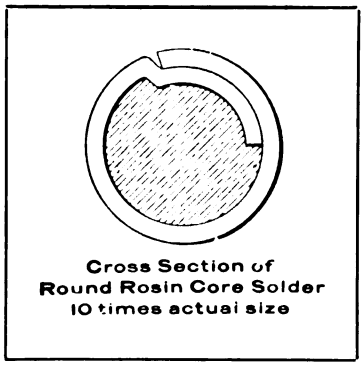
ECONOMY IN SOLDER.

CORROSION of fine wire at a soldered joint is eliminated by the use of a rosin flux when applying the solder. The most satisfactory way to make the joint is by the use of a solder which is rolled up into a small tube, within which the rosin in a powdered condition is placed. Solder of this type is used by telephone companies almost universally. One of the principal difficulties which is experienced in practice is that after being carried about for a time, as it frequently is in the tool bag of an inspector, the seam of the tube, which is unsealed, becomes partially open and the flux filters out from the tube.

The Belden Manufacturing Company, of 194 Michigan street, Chicago, Ill., has designed a method of manufacturing a self-fluxing solder, in which the seam has a wide overlapping surface, so that there is little danger of its spreading. In this manner the waste, which so often reaches an amount far beyond that actually consumed in use, is avoided. The company claims that, in addition to the advantage obtained from the special method of manufacture, the soldering composition used is one which long experience has proved to be absolutely satisfactory for telephone work. The rosin is put in by a special process, so that the tube is compactly filled throughout its entire length. The advantage of a tube which is full of rosin and will stay full will be appreciated by all who have seen the result of attempting to make a firm joint with solder containing insufficient flux.

The company will be pleased to furnish further information to those desiring to use this economical material.



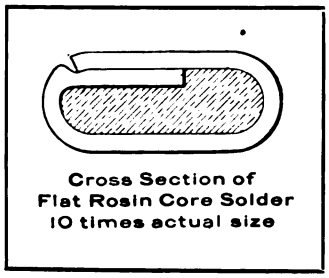
Solder made by the Belden Manufacturing Company, showing seam overlapping ¼ of circumference.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, of Chicago, has recently opened branch offices in Kansas City, Mo., 308 Nelson building, and Omaha, Neb., 615 Bee building. The former is in charge of W. O. Rhode and the Omaha office is in charge of F. M. Ferguson. Both of these gentlemen are salesmen of ability and wide experience and have a wide acquaintance in their respective territories.

COOK GETS ST. LOUIS.

THE order for the complete protector equipment for the new exchange of the Kinloch Telephone Company, of St. Louis, has been awarded to Frank B. Cook. This is claimed to be the largest single order for protective apparatus that has ever been placed in this or any other country, as the new Kinloch rack will be the largest single rack in existence. The order calls for 16,000 pairs of protectors, and the type to be furnished by Cook is a brand new one. Mr. Cook says it is a radical departure, both in principle and design, from any protector now made, and has a great many particularly good points to recommend it. However, as it will take some time to fill the St. Louis order, he is not ready to enlarge on its merits, or to offer it for sale to other exchanges for some time to come. The order was placed by the Stromberg-Carlson Telephone Manufacturing Company.

THE ELECTRIC GOODS MANUFACTURING COMPANY, Boston, Mass., formerly known as the Electric Gas Lighting Company, is mailing a leaflet to the trade drawing attention to the change in its corporate name. Twenty-five years ago when this firm started in business its principal commodity was gas lighting apparatus. It built up one of the largest trades in the country, and its name became synonymous with quality and business integrity. However, of recent years the company has branched out into other lines, and now either manufactures or is selling agent for almost every line of electrical apparatus. Under these conditions the former name of the company had become misleading, and it was therefore decided to change it to one more appropriate. The sign of the four circles is still employed, and this will serve to identify the business until the new title is thoroughly known.



THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, of Chicago, reports considerable success in the introduction of its latest "leader," the new permanently adjusted receiver. The furnishing of these receivers to small and large buyers alike at one dollar each has proven one of the best methods that could be adopted for more widely introducing "International" equipment.

SECRET SERVICE IN AUSTRALIA.

THE steamer Ventura, out of San Francisco March 8, will carry a complete equipment of secret service apparatus, to be installed by the Australian Government at Brisbane. The equipment was furnished by the Baird Manufacturing Company, of Chicago.

THE AMERICAN ELECTRIC FUSE COMPANY, of Muskegon, Mich., receives most prominent mention in a paper reviewing the business development of the city which has been recently published. It is stated that the company was incorporated August 13, 1895, with a capital stock of $25,000. It then employed seven people and did a business of $11,000 the first year. During the first eight months of 1901 it gave employment to 250 workmen and did a business of $160,000, or at a rate of almost a quarter of a million dollars a year. The factory was moved to Muskegon during 1905 and now gives employment to between 300 and 400 mechanics. The company has secured from the Rolfe Electric Company, of Chicago, the exclusive right to manufacture the well known Rolfe protective apparatus, and is therefore placing before the trade a complete line of protectors. It maintains in New York City, Atlanta, Ga., and in Chicago sales offices where a complete stock of goods is always carried for the purpose of making quick shipments. It has purchased materials sufficient to insure against delay by reason of inability to secure raw stock, and feels confident that it will be able to give immediate shipment upon all orders for stock goods received.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, Mo., is mailing monthly calendar cards to the trade. These are very attractively designed and besides serving the purpose of a calendar also advertise certain specialties the company has for sale. This month the Gyrofan, a new type of electric fan, is illustrated and described. For operating and terminal rooms it is claimed to be superior to the old stationary fan. Further particulars and prices can be secured from the company.

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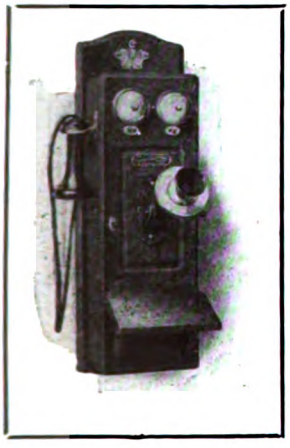
We're from Missouri and you've got to show us

a better telephone than our "New Beauty." Personally, we know you can't; it doesn't exist. Now, we won't be verbose about the wonderful transmitter, or the perfect qualities of the receiver, or the fancy kinks to the generator or ringer, because any one of them isn't the whole thing by a long sight. What we will tell you is, that every part of our telephone is good. That's a plain, unvarnished fact. Now the best thing you can do is to apply the Missouri principle to yourself and we'll "show you." That's fair, isn't it?



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THE WEEK'S MESSAGES

FINANCIAL.

CARBONDALE, ILL.—The Farmers' League & Community Telephone Company, of Carbondale, has increased its capital stock from $2,500 to $5,000.

PECAN, TEXAS.—The North Texas Telephone Company has increased its capital stock from $5,000 to $10,000.

FRANCHISES.

CALISTOGA, CAL.—The Palaside Mining Company has applied for a franchise to construct and maintain a telephone system.

NAPA, CAL.—R. L. Grigsny, of Napa, has been granted a telephone franchise in Hot Springs.

LAMAR, COL.—The Big Bend Rural Telephone Company has been granted a franchise to operate a telephone exchange in Lamar.

FLORA, ILL.—The City Council has granted a franchise to the People's Telephone Company.

HOWARD, KAN.—O. B. Walker has been granted a telephone franchise at Howard.

RUSSELLVILLE, KY.—The Home Telephone Company, of Bowling Green, Ky., has secured a franchise in Russellville. The company will at once begin the work of putting in a plant.

ANAMOOSE, N. D.—W. E. Glotzbach is asking the City Council for a franchise.

LAWTON, OKLA.—W. P. Records, F. H. Miller and F. M. English have applied for a franchise at Lawton.

ECHO, ORE.—The Butter Creek Telephone Company has applied for a franchise at Echo.

TEXARKANA, TEX.—The Texarkana Telephone Company has been granted an exclusive franchise on the Texas side of the city.

CASTLEDALE, UTAH.—R. C. Miller, of Castledale, has been granted a franchise to construct and operate telegraph and telephone lines in the county of Emery, Utah.

CLYDE, WASH.—Messrs. Eilert and Bradburg have been granted a telephone franchise to build a line from Clyde to Lamar.

LATAH, WASH.—The Springtown & Latah Telephone Company has applied for a franchise to construct and operate telephone lines on the roads in the vicinity of Latah.

ROCKFORD, WASH.—The Rockford & Mt. Hope Telephone Company has applied for a telephone franchise at Rockford.

LETHBRIDGE, ALBERTA, CAN.—A. J. Arnold, an attorney of Windsor, has applied for charter for a railway company with powers to operate a long distance telephone line from Lethbridge to Edmonton by way of Calgary and High River, alongside the railroad tracks, and with power to make what connections shall be considered necessary.

COMBINATIONS.

BOSWELL, IND.—F. A. Ross and others have purchased the Earl Park & Raub telephone systems owned by Dickson & Atkins. The lines will be extended and new apparatus added.

DEER CREEK, IND.—J. M. Davis, of Deer Creek, has sold his telephone system to W. A. Miller and Lester Ramsey.

WINCHESTER, IND.—The Eastern Indiana Telephone Company has completed a deal by which it comes into possession of the exchange at Saratoga, with 100 telephones and toll lines to Ft. Recovery, O.

ELECTIONS.

LIMA, IND.—The Lima Telephone Company has elected the following officers: D. J. Cable, president; S. S. Wheeler, vice-president; W. H. Duffield, treasurer; G. Methany, secretary.

EATON, O.—The Eaton Telephone Company has elected the following officers: C. F. Brooks, president; L. D. Leah, secretary; Elam Fisher, treasurer.

MARIETTA, O.—The Marietta & Caldwell Telephone Company has elected the following officers: A. L. Gracey, president; W. H. H. Jett, vice-president; Ralph Wooster, treasurer and general manager; A. C. Davis, secretary.

LITTLE MEADOWS, PA.—The Little Meadows Telephone Company has elected the following officers: A. D. Brown, president; F. A. Johnson, vice-president; W. D. Minkler, secretary and treasurer.

NEW COMPANIES.

COLFAX, ILL.—The Colfax Telephone Company, Colfax, has been incorporated with a capital stock of $15,000. Incorporaters are William Gaddis, J. P. Arnold and F. J. Harris.

MATTOON, ILL.—The Coles County Telephone & Telegraph Company, Mattoon, has been incorporated with a capital stock of $100,000. Incorporators: I. L. Lumpkins, W. G. Lumpkins and John McNutt, Jr.

CUTLER, IND.—The Cutler Co-operative Telephone Company has been incorporated with a capital stock of $4,000. The directors are W. H. Draper, Noah Flank and William Smith.

MANSON, IND.—The Manson Co-operative Telephone Company has been organized with a capital stock of $1,000.

NOBLESVILLE, IND.—The Highland Telephone Company has been incorporated with a capital stock of $20,000. The directors are Albert Craig, Claude Beaver and A. H. Sheffer.

RICHMOND, IND.—The organization of the New Paris Independent Telephone Company has been perfected. The capital is $20,000. The following are the directors: W. D. Rush, Greenville, O.; C. S. Brooks, C. B. Cokefair, L. D. Lesh, Elam Fisher, of Eaton, O.; S. C. Richey and E. O. Dowler, New Paris, and A. C. Lindemuth, of Richmond. Long distance connections will be established and the service improved.

SHIPSHEWANA, IND.—The Mutual Telephone Company, of Shipshewana, has been incorporated with a capital stock of $10,000. Directors: D. A. Platz, Levi A. Kauffman, M. S. Yoder, W. H. Weaver, H. J. Hostetter and D. J. Miller.

TERRE HAUTE, IND.—The Citizens' Independent Telephone Company, of Terre Haute, has been reorganized. A bond issue of $1,000,000 has been ordered, and $200,000 set apart for construction work.

CHICKASHA, I. T.—The Washita Valley Telephone Company has been incorporated with a capital stock of $10,000. The company will build a line from Chickasha to Lindsay.

CHARITON, IA.—The English Telephone Company, Chariton, has been incorporated with a capital stock of $10,000. Incorporators: A. C. Curtis and others.

MIDWAY, IA.—The Midway Telephone Company has been formed with B. F. Taylor as president and J. E. Goldsbery as secretary and treasurer.

ST. LUCAS, IA.—The St. Lucas Farmers' Telephone Company, of Fayette county, has been incorporated.

DONEGAL, KAS.—The Donegal Mutual Telephone Company has elected the following officers: President, R. Nessing; vice-president, H. J. Altman; secretary, L. L. Hoffman; treasurer, A. L. Buck.

EDMOND, KAS.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $5,000. The directors are: E. W. Wood, J. P. Paul, John McMullen, E. W. Childers, of Edmond.

EXCELSIOR, KAS.—The Centerville Rural Telephone Company has been incorporated with a capital stock of $1,020.

LONG ISLAND, KAS.—The High Line Telephone Company has been incorporated with a capital stock of $1,650.

CORINNA, ME.—The West Penobscot Telephone & Telegraph Compan, Corinna, has been incorporated with a capital stock of $10,000. The incorporators are C. L. Jones, J. E. Gray, H. B. Rackliffe, C. T. Moses and others.

CLAYTON, MICH.—The Clayton Telephone Company has been incorporated with a capital stock of $1,000.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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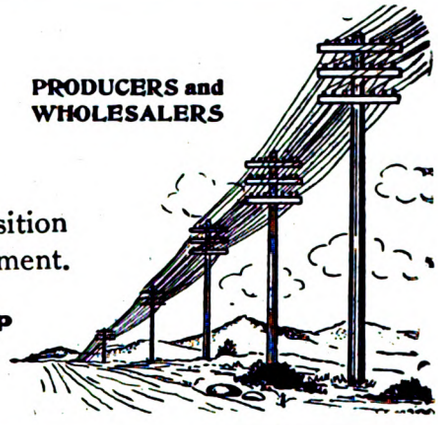

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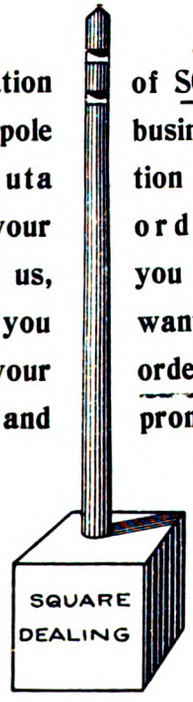

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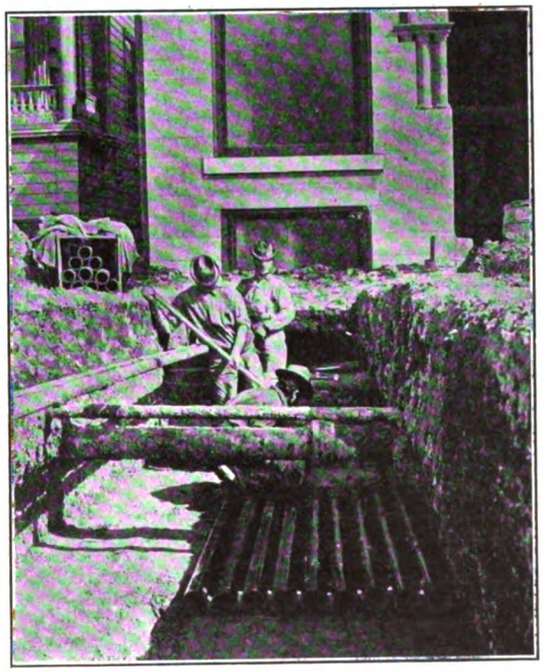

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THE WEEK'S MESSAGES

RANKIN, MICH.—The Mundy Telephone Company, of Rankin, has been incorporated with a capital stock of $10,000.

OSCAR, MINN.—The Oscar-Trondhjem Farmers' Telephone Company has been incorporated. Incorporaters: O. K. Aalberg, Swen Larson, T. E. Stras and others.

STARBUCK, MINN.—The White Bear Lake Telephone Company, Starbuck, has been incorporated with a capital stock of $8,000. Incorporators are: B. M. Tessenen, H. L. Gorder, J. E. Moin, J. C. Gorder, of White Bear; L. K. Rio, Starbuck, and others.

VIVIAN, MINN.—The Farmers' Star Line Telephone Company has been organized with the following officers: Alex Latourell, president; Louis Kaufman, vice-president; J. P. Kremer, secretary; William Beyer, Jr., treasurer.

BALLWIN, MO.—The Ballwin Mutual Telephone Company has been incorporated with a capital stock of $2,000. The directors are A. A. Weber, Henry Heinemann, Tim Munsch, Edward Blinne and C. L. Shotwell.

HOPEWELL, MO.—A telephone company has been organized at Hopewell, with J. D. Smith, president, and W. H. Wirts, secretary.

LINNEUS, MO.—The Linneus Rural Telephone Company has been incorporated with a capital stock of $5,000. President, Alex Brinkley; E. H. Schrock, secretary.

ST. LOUIS, MO.—The Electric Construction Company, of St. Louis, has been incorporated with a capital stock of $125,000. Incorporators: Max Koehler, C. M. Foster, S. B. Jeffries and others. The new company will construct telephone plants.

SPANISH LAKE, MO.—R. G. Hereford and E. M. Denny are organizing an Independent telephone company at Spanish Lake.

FORSYTH, MONT.—The Forsyth Telephone Company has been incorporated with a capital stock of $20,000. In addition to installing a telephone system in Forsyth the company is to build lines to Miles City, Ashland and other points.

CLATONIA, NEB.—The Farmers' Mutual Telephone Company, of Clatonia, has been incorporated with a capital stock of $1,200. The incorporators are B. C. Albert and others.

HICKMAN, NEB.—The Hickman Telephone Company has been incorporated with a capital stock of $6,000. The directors are Adam Brendle, C. H. Hempel and August Schmitte.

PAGE, NEB.—The Page Telephone Company, Page, Holt County, has been incorporated with a capital stock of $10,000.

ESTANCIA, N. M.—The Board of Trade has taken up the matter of organizing a company for the purpose of building a local telephone line.

ALLEGHENY, N. Y.—The Citizens' Telephone Company has been organized. The organizers are C. L. McGavern and Clair S. McGavern, Allegany, N. Y.

EAST SPRINGFIELD, N. Y.—The East Springfield Telephone Company has been incorporated with a capital stock of $10,000. The company proposes to operate lines from Richfield Springs to Cherry Valley, and also to Cooperstown and along the Mohawk River, and to Sharon Springs. The directors of the company are Henry Rathbon, of Cooperstown; S. A. Young, H. W. Young and O. R. Young, of East Springfield.

MISCELLANEOUS.

FREMONT, IA.—W. D. Dunsmore, of Oskaloosa; H. D. Bell and Mr. Morris, of Delta, have acquired possession of the Farmers' & Traders' Telephone Company. The new company expects to improve the service and extend the system.

TRUMAN, MINN.—The Armstrong Telephone Exchange Company was organized in 1901 with a capital of $25,000. In 1904 the amount of capital was raised to $100,000. The company has recently elected the following officers: John N. Burrell, president; John Robinson, vice-president; R. O. Armstrong, secretary and treasurer.

WINNIPEG, MAN., CAN.—The Canadian Pacific R. R. Company has decided to connect its hotels in the Rocky Mountains with a copper telephone circuit. The work involves the stringing of 126 miles of wire. Address Superintendent of Telegraph Jenkins, or F. F. Busteed, assistant to chief engineer.

PORT ARTHUR, ONT., CAN.—The town will erect a municipal telephone exchange to replace the present building. Address J. McTeigue, town clerk.

ST. JOHNS, N. B.—The N. B. Telephone Company is to build 185 miles of line, from Buctouche to Campbellton.

PERSONAL.

DUDLEY T. COOK has been appointed manager of the exchanges at Ottawa and Olathe, Kas., by the Missouri and Kansas Telephone Company.

FRED COULSON has been appointed assistant construction engineer for the Missouri and Kansas Telephone Company, with headquarters at Kansas City, Mo.

LOUIS GLASS has been re-elected vice-president and general manager of the Pacific States Telephone Company.

A. O. HEDBURG has been transferred from Benson to Morris, Minn., where he has charge of the plant of the Tri-State Telephone & Telegraph Company.

J. P. MARCH has been appointed assistant superintendent of the New Orleans district by the Cumberland Telephone and Telegraph Company.

A. L. SHAW, who has been well known to the telephone fraternity between New York City and the Canadian line during his connection with the equipment department of the Hudson River Telephone Company, has recently accepted a position with the Sumter Telephone Manufacturing Company, of Sumter, S. C.

W. T. VAUGHAN has been appointed manager of the exchange of the Cumberland Telephone & Telegraph Company at Mayfield, Ky.

New Construction in the Field

ROGERS, ARK.—The North Arkansas Telephone Company is stringing a long distance wire from Rogers, Ark., to Seligman, Mo.

STAMPS, ARK.—The Independent Telephone Company, of Stamps, Ark., is to build a telephone exchange capable of accommodating a population of 5,000.

FALL RIVER MILLS, CAL.—The Local Telephone Company, recently organized at Fall River Mills, is to build a line from Fall River Mills to Bartle.

BERTHOUD, COL.—At the annual meeting of the Consolidated Home Supply Ditch & Reservoir Company a committee consisting of C. C. Clark, Will Bader and John Coleman was appointed to confer with the Eastern telephone construction companies with a view to building an independent telephone line along the route of the company's ditch, connecting Berthoud, Loveland and Johnstown.

RIFLE, COL.—The Rifle Creek Telephone Company is to extend its lines to White River.

ATLANTA, GA.—The Atlanta Telephone & Telegraph Company is to have connections with Decatur, Kirkwood, East Point and a number of other points.

WASHINGTON, ILL.—The Washington Telephone Company is to build a line from Washington to Pekin.

HEATH, MASS.—The Heath Telephone Company will soon commence construction work in Deerfield, Conway, Whately, Charlemont, Hawley and Ashfield.

LEBANON, N. J.—The Lebanon Telephone Company is to extend its line from Califon to Fairmount.

ALBANY, N. Y.—The Albany Home Telephone Company has secured new lines to run through Coeymans, Ravena, Indian Fields, Dormansville and Coeymans Hollow.

ASHLEY, O.—The Ashley Telephone Company is to build lines to Marengo, Shawtown and other places.

LORAIN, O.—The Black River Telephone Company, which has recently declared a dividend of 6 per cent, is to extend its lines to the east, west and south of the city.

OSTRANDER, O.—The Ostrander Telephone Company is about to commence the construction of its line.

ROSEBURG, ORE.—The Roseburg, Cleveland & Coles Valley Telephone Company is to build a line from Roseburg to Cleveland, and from Roseburg to Coles Valley.

CHARLESVILLE, PA.—The Friends' Cove Mutual Telephone Company is to construct 27 miles of new line.

CONESTOGA, PA.—The Conestoga Telephone Company is to run a line to Earlville.

KUTZTOWN, PA.—The Independent Telephone Company is to run a line from Kutztown to Kempton.

RIDGEVILLE, S. C.—The telephone system at Ridgeville, owned by P. A. Salvo, Jr., of Charleston, and W. A. Salvo, of Givhans, is to be extended to Mixson.

COLUMBIA, WASH.—The Citizens' Telephone Company, of Columbia, recently organized, is to spend $50,000 in construction work.

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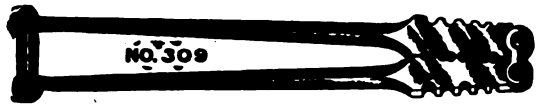

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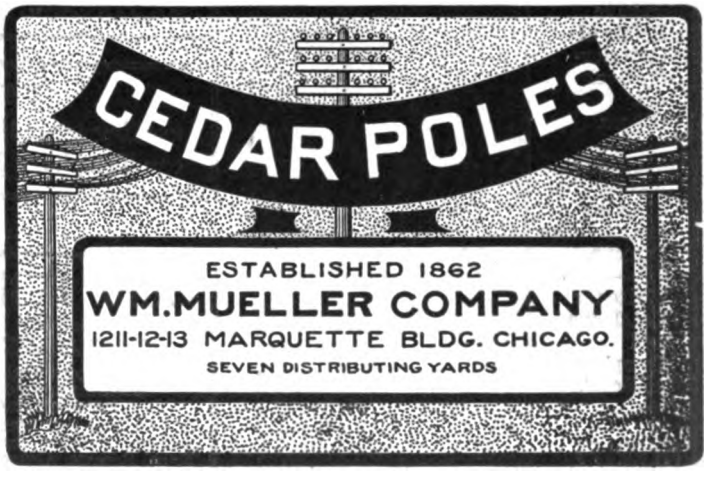

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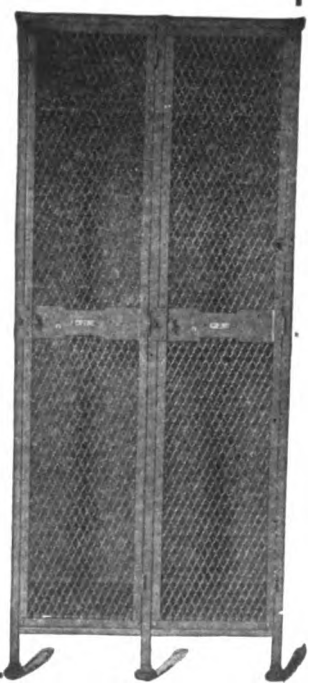

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Write for Sample Forms and Prices.
THE TELEPHONE PRINTING CO.
DEFIANCE, OHIO

TELEPHONE SYSTEMS Promoted, Engineered and Built by
Piedmont Electric Co.
Anderson, South Carolina

M. LANZ & SONS
Manufacturers of
Thimbles & Ground Rods
WE GALVANIZE BY THE HOT PROCESS
PITTSBURG, PA.

OKONITE
TRADE MARK
REG. U.S. PATENT OFFICE.

1889—Paris Exposition Medal for Rubber Insulation 1893—World's Fair Medal for Rubber Insulation
The Standard for Rubber Insulation
Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., 253 Broadway, New York
Sole Manufacturers
WILLARD L. CANDEE, H. DURANT CHEEVER, } Managers
GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

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Cord Troubles Are Past if You Use the "EACO" STEEL SWITCHBOARD CORD

The general appearance of all makes of Cords are about the same, but when quality is taken into consideration there is a vast difference. "Eaco" Steel Switchboard Cords have the quality and give the service Exchange Managers are looking for. Our prices are right, our Cords are right. Send for sample.

ELECTRIC APPLIANCE COMPANY, Chicago, Telephone Manufacturers

BRANCHES: SAN FRANCISCO, DALLAS, NEW ORLEANS

Better Than a Bank

The public makes the deposits and keeps the cash box filled.

The Telephone Company draws the money and always finds it there.

Write for Booklet.

Baird Manufacturing Co., Chicago

6 MICHIGAN STREET

We believe that quality will win nine times out of ten

THE Penny-wise may buy cheap batteries for a time, believing they are thereby practicing economy but they will eventually realize the folly of such action. The shrewd buyer buys the best, for he knows that

Quality counts

Get a few 1900 cells and prove it for yourself

THE

Stromberg-Carlson Telephone Mfg. Co.

ROCHESTER, N. Y.

Branch Sales Office - - - Chicago, Ill.

THE TIME IS AT HAND

SIDE BRACKET.

Patented

TYPE A—10-Pair Hall Cable Box.

for you to take up your line construction. If you have decided to erect cable, you will need cable terminals for distribution purposes. In the selection of this apparatus, you should be guarded by the following specifications: The terminal must be efficient, durable, compact, watertight, easy of access and inexpensive.

The one terminal which conforms with these rules is the HALL.

If you have tried others, you will know by looking at the illustration that our claim is good.

No terminal was ever devised which embodies all the good features of this one.

We make it in different types for pole top or side bracket distribution and in capacities suitable for all uses.

Get posted on the HALL CABLE TERMINAL, because it is the terminal that protects.

Write for detailed information and prices.

THE MOUNTAIN STATE ELECTRICAL COMPANY,

WHEELING, WEST VIRGINIA.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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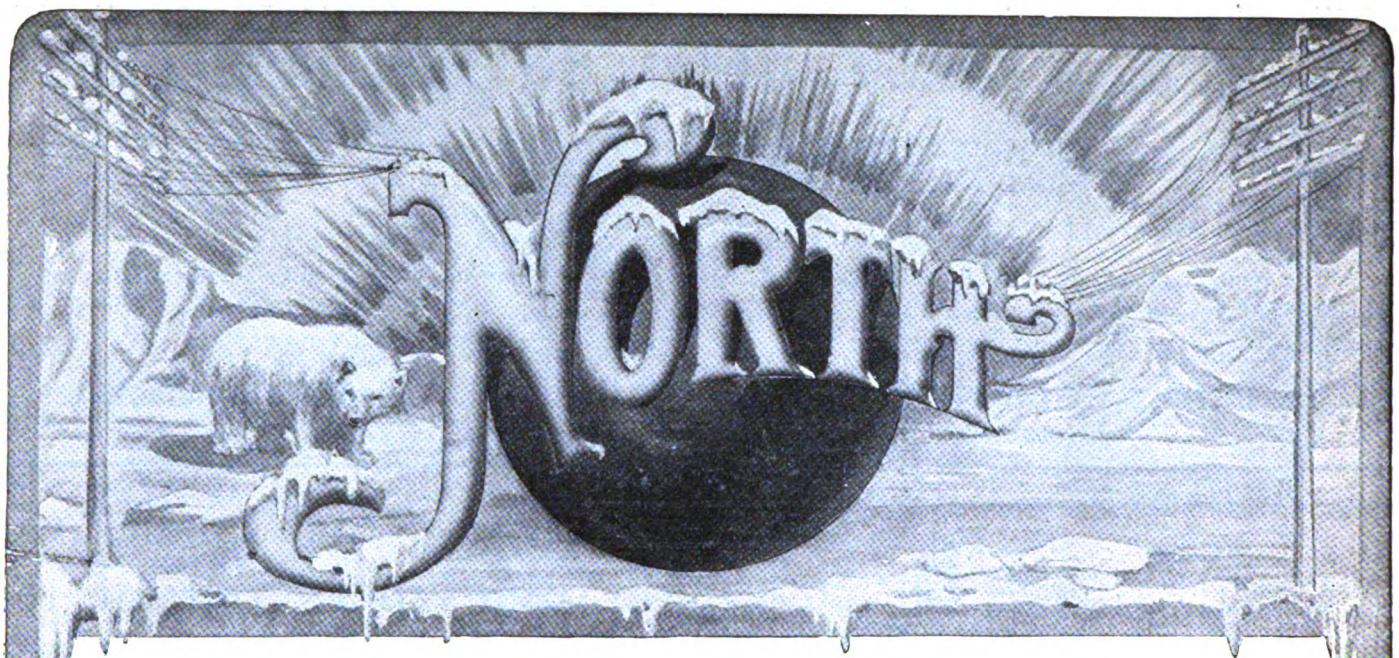

NORTH'S Solid Back Transmitter combines ample volume, perfect articulation, deep penetration and natural pitch. It reproduces the voice high or low, loud or soft—a loud voice without breaking or blurring.

The full round volume is attained by entirely eliminating dampening springs; there is no unequal pressure on one side of the diaphragm, which is dish-shaped for confining its action to the path of the voice vibrations.

A small amount of polished granular carbon in a specially formed shallow cell eliminates packing.

All parts are made in jigs and tested accurately to a ten-thousandth part of an inch and there are no accidental transmitters in the product.

Just as a precaution, though, they are tested by an engineer before leaving the factory, under conditions approximating actual service.

CHICAGO CLEVELAND DALLAS

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO

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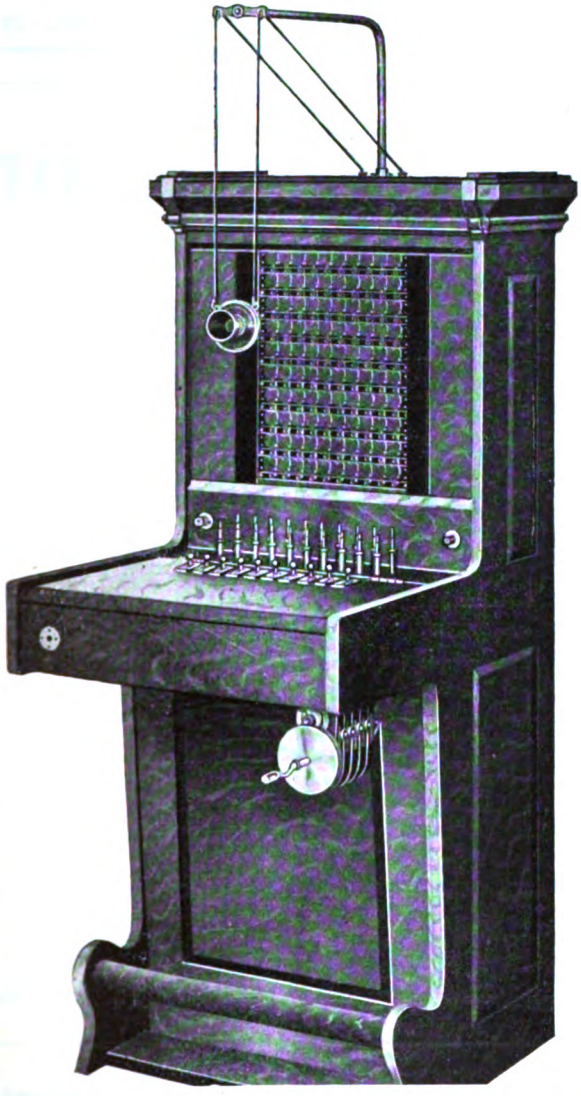
CENTURY

100 % GOOD



PERFECT MAGNETO SWITCHBOARDS

If you are in the market for a new magneto switchboard and wish to give your subscribers the very best service, at the same time reducing your maintenance expenses, it will be to your interest to use a CENTURY switchboard.

Every detail in our switchboards is carefully designed and constructed so as to eliminate all possible chances for trouble.

All parts are so made that they can be readily removed and replaced.

We would like to send you sample drops, jacks and other parts for your inspection, which we will do, charges prepaid. We hope that when you are in the market you will allow us to submit prices to you.

We have a four party selective system that is applicable to any size of magneto exchange.

This system is entirely different from any other in the market.

It has been thoroughly tested and found to be the most practical and economical of any in the market at the present time.

Write for particulars.

CENTURY TELEPHONE CONSTRUCTION CO.

332 ELLICOTT STREET

BUFFALO, N.Y.

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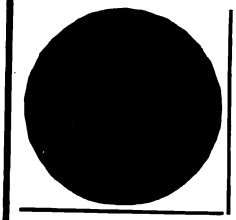
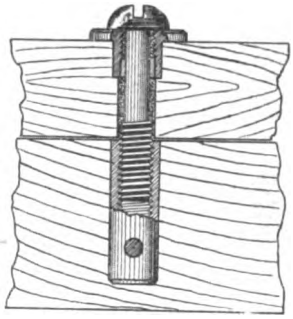
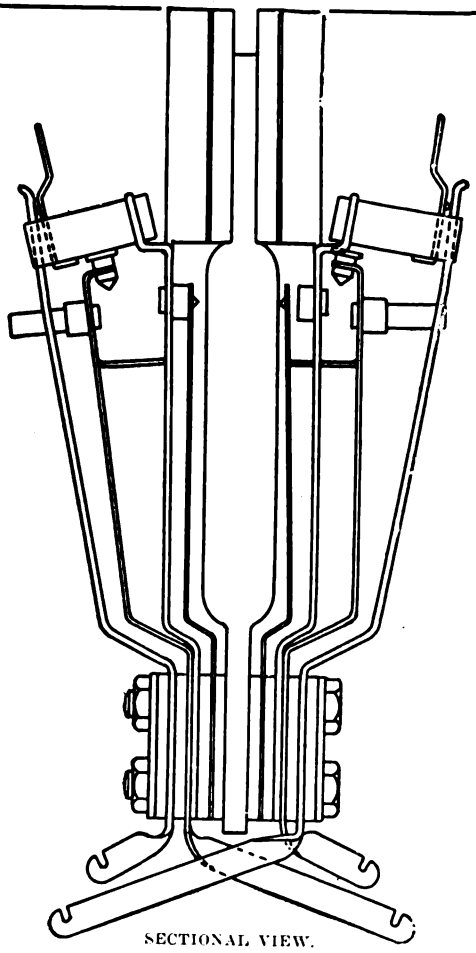


Little Things That Count



Unless otherwise ordered MONARCH TELEPHONES have a door fastening like that shown in the illustration. Two such fastenings are on each door. A machine screw passes through a bushing in the door and fastens in a slightly larger bushing in the box. The threaded portion of the screw being larger than the shank, the smaller bushing keeps the screw from falling out when loosened.

MONARCH TELEPHONE MFG. CO., - - - CHICAGO, U. S. A.



SECTIONAL VIEW.

Cook No. 14 Protector

A Well-known, Well-tried Protector, Wonderfully Improved

TWO HUNDRED AND TWENTY THOUSAND (220,000) of these same heat coils were installed during 1904 and 1905. They are giving perfect satisfaction.

The following exchanges have installed or ordered Cook No. 14 SINCE JANUARY 1, 1906:

Syracuse, N. Y.	6,100	pairs.
San Antonio, Tex.	3,300	"
Bloomington, Ill.	1,950	"
Paris, Ill.	1,380	"
Kansas City, Mo.	1,160	"
Canandaigua, N. Y.	1,000	"
Normal, Ill.	440	"

No bolts or pieces of wire used in transposing line and switchboard terminals (see diagram). No chance of loose connections in the circuit.

When the coil operates, a split spring tightly grips the tip, and prevents its falling into the lower banks of springs.

Lots of other good points that you want to know about. Write and ask. If you're interested, we'll give you a list of engineers and exchange managers who swear by this protector.

Frank B. Cook. Mfr, 238 W. Lake St. CHICAGO, U. S. A.

HOW TO ORGANIZE, BUILD AND OPERATE TELEPHONE LINES AND SYSTEMS

A GREAT BOOK . . PRICE 25 CENTS

Telephones, Switchboards and Line Material

ILLUMINATED TELEPHONE SIGNS

ELECTRICITY, GAS, OIL

CADIZ ELECT. CO.

I C.C.C. B'LD'G. CADIZ, O.

Flexible Telephone Cords

BELDEN CORDS ARE BUILT ON APPROVED SPECIFICATIONS AND ARE DURABLE AND PLEASING IN APPEARANCE. OUR CORD DEPARTMENT IS MODERN AND OF LARGE CAPACITY. OUR DELIVERIES ARE PROMPT AND PRICES ARE RIGHT.

Samples and Prices cheerfully sent on request. Correspondence Invited.

BELDEN MANUFACTURING COMPANY

194 MICHIGAN STREET

CHICAGO

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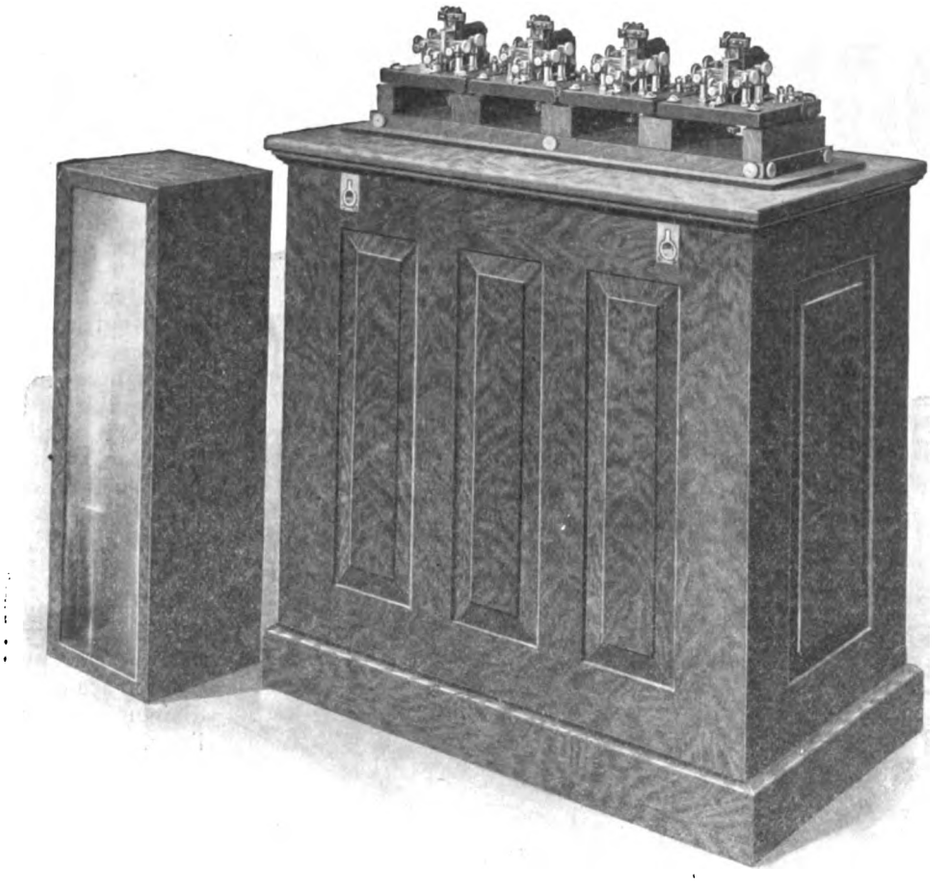
DEAN TELEPHONE APPARATUS



The accompanying illustration shows our Harmonic Converter to which we called your attention in last week's advertisement. It is a new device for supplying alternating ringing current for our harmonic party line system as well as for all regular exchange ringing. Adaptability to any size exchange, reliability and high economy in operation are the novel features.

The Harmonic Converter makes our party line system complete in every detail from the source of ringing current to the absolute non-interfering ring at the subscriber's telephone. We pride ourselves as being the first to produce these results.

The Harmonic Converter shown has its vibrator cover removed. The cabinet is made of finely finished quarter sawed oak and occupies a floor space of 18¼ x 31¼ inches. All of the parts are most substantially constructed and are interchangeable.

These machines are the result of several years of persistent experiments; the difficulty being in producing the proper results economically. They have now long passed the experimental stage—we having a large number in successful operation. Write for Folder No. 5-A, which is descriptive of the Harmonic Converter.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY —— **THE BEST IS THE CHEAPEST**

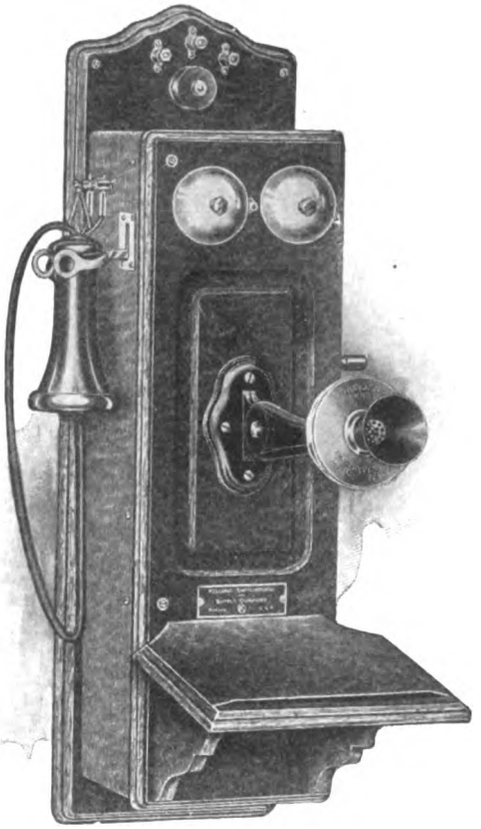
KELLOGG
BRIDGING TELEPHONES

Manufacturers of Telephone Switchboards of any size and description for common battery and magneto systems. Telephones of all kinds, Telephone and Line Supplies, Switchboard Cables, Wires, Poles, Miniature Lamps.

Highest Awards
GOLD MEDAL
Buffalo, 1901

GRAND PRIZE
St. Louis, 1904

Our telephones are built to last, and the "Kellogg" Guarantee is back of every one we sell.
Send for Folder No. 1.



FOUR GOOD SPECIALS

Set No. 1303—With Grounding Key. With this attachment you can ring the other subscribers on your line without calling the exchange. Or, you can call the exchange operator without ringing the other bells on the same line. SIMPLE—INEXPENSIVE—EFFECTIVE.

Set No. 1298—Condenser in the Secondary Circuit. Bells can be rung when all the receivers are off their hooks. Indispensable for heavily loaded lines.

Set No. 1274—Transmitter Cut-Out. Saves batteries and is a great convenience.

MADE TO ORDER—Selective 2 or 4 Party Instruments with Direct Current Generators. Enable you to call central without ringing the other parties on the line.

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES

PHILADELPHIA, PA. Keystone Tel. Building
CLEVELAND, OHIO Electric Building
NEW YORK CITY 116 Nassau Street
LOS ANGELES, CAL. 318 W. Second Street

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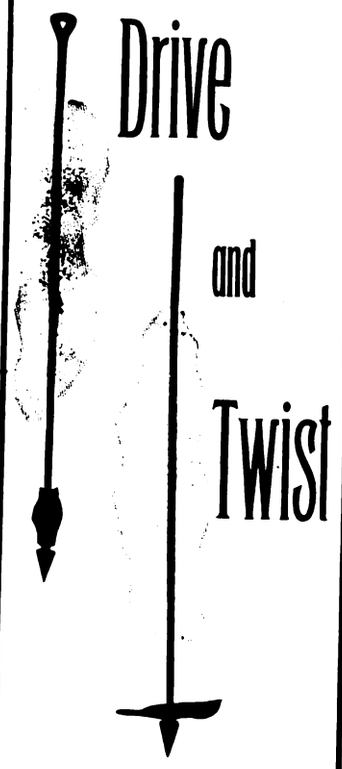


Drive and Twist

Installed in 60 Seconds

Pulls on SOLID DIRT

STRONGEST ANCHOR MANUFACTURED

Specially Designed for STONY SOIL

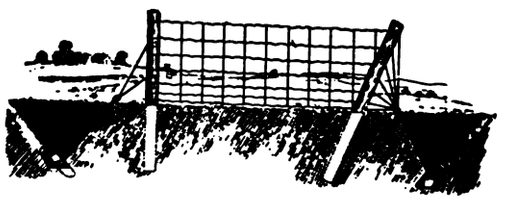
Write for new complete catalogue

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

"Hercules" Anchors

MADE OF MALLEABLE IRON



"HERCULES" Anchors are easy set.

"HERCULES" Anchors pull against solid earth.

"HERCULES" Anchors are strongest made.

"HERCULES" Anchors will not creep.

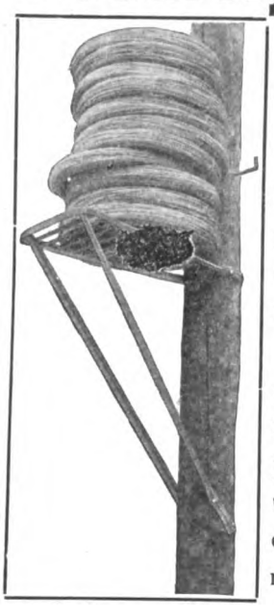
Send for Prices and Circulars

The W. G. Nagel Electric Co.

28-32 ST. CLAIR ST. TOLEDO, O.

900 POUNDS PILED ON A

Security Pole Seat



Which Itself Weighs Only 28 Pounds

Most Poles are already overloaded. Did you ever calculate the strain? It makes necessary the lightest seat, remembering strength, too, and cost.

Made of angle iron, not notched, no rough edges to tear hands and clothing. The perfect construction obtained only by the use of specially designed machinery.

SEND FOR FURTHER INFORMATION AND PRICES

TOLEDO, OHIO · THE F. BISSELL COMPANY

THE F. BISSELL COMPANY, TOLEDO, O.

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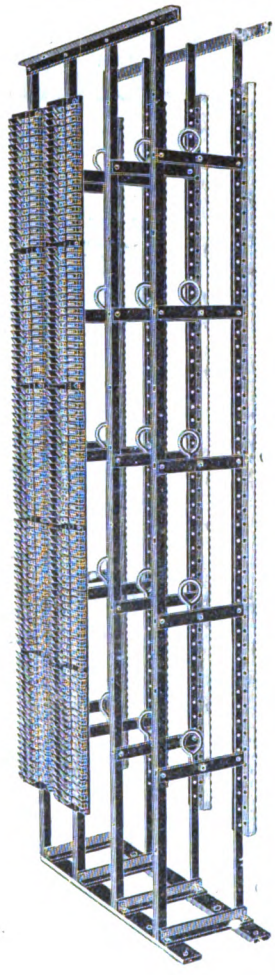
We Have It



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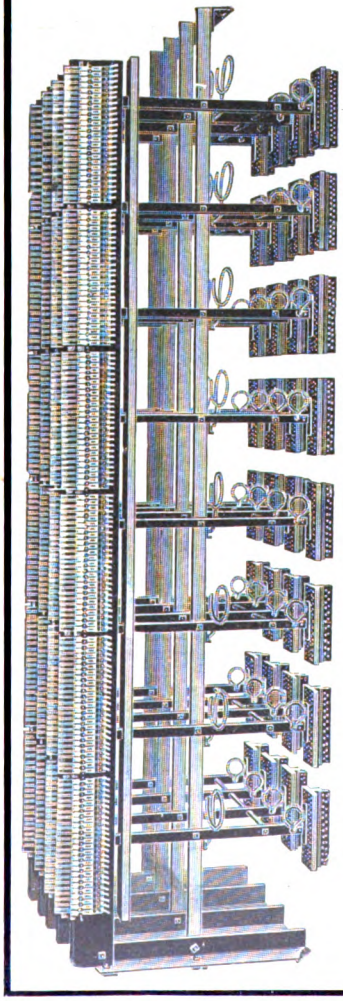
No. 237 Frame

Fuse and Carbon PROTECTION

Sterling Electric Company

La Fayette, Ind.



None Better

STERLING ELECTRIC COMPANY

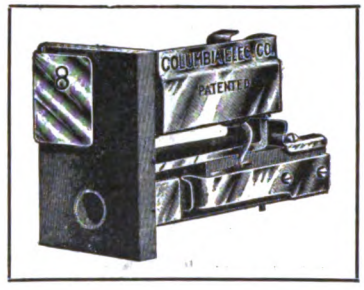
No. 238 Frame

Heat Coil and Carbon

Sterling Electric Company

La Fayette, Ind.

STOP! THINK!

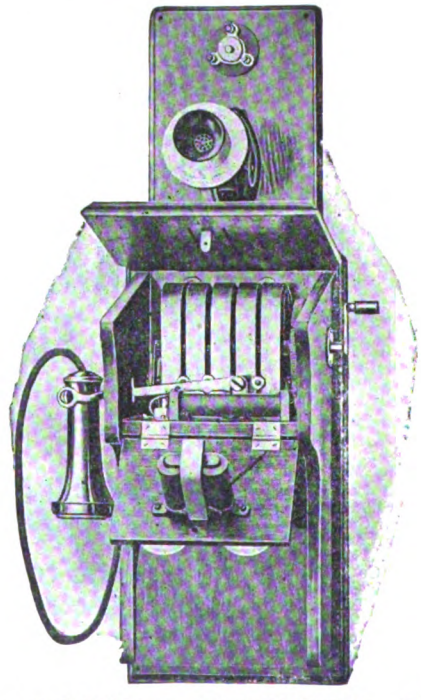


FIRST IMPRESSIONS are often misleading. You may not have thought that we could supply you with any parts you might need, but we can.

Drops similar to the illustration fit Eureka Board, self restoring. Bridging, $1.75. Series, $1.50, wound with best silk magnet wire, guaranteed true resistance, ringing keys, with platinum points, jacks, telephone ringers, telephones, etc. Let us estimate upon your next order. It won't inconvenience us and it will save you $$$$$$.

COLUMBIA ELECTRIC CO.

McCORDSVILLE, IND.



NEW "CONN." MAGNETO PHONE

CENTRAL ENERGY STYLE

Furnished for Any Combination. Capacity 3 Dry Batteries

UP-TO-DATE EQUIPMENT

WRITE FOR PRICES

CONNECTICUT TELEPHONE & ELEC. CO.

MERIDEN, CONN., U. S. A.

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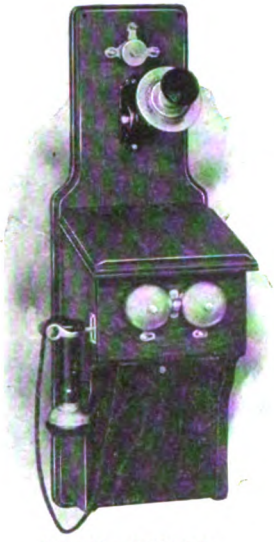
IMPROVED

Compact Magneto Telephone

No. 88.

New Swedish Beauty.



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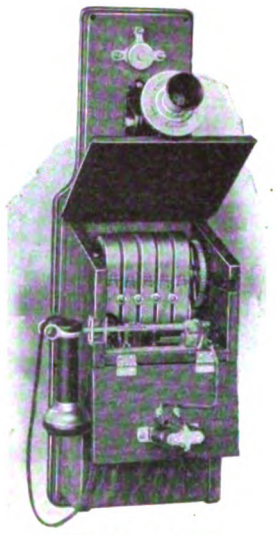
SERIES OR BRIDGING.

Built with a view of permanent good service, 100 per cent. good.

TELEPHONE BUYERS

we ask you to investigate; a card from you will get our proposition by return mail. You cannot afford to be indifferent to a business opportunity of this character.



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Swedish-American Telephone Co.

CHICAGO.

NEARLY 90 PER CENT.

of all the telephone exchanges (both new and replacements) sold in the United States during the past few years have been

OUR AUTOMATIC SYSTEM—BECAUSE

It improves the service; being perfect, prompt and absolutely private, thus supplying a logical reason for advancing rates which have been too low.

It lowers the expenses; costs 50% less to operate and maintain than a manual exchange.

It makes it possible for the operating companies to pay good dividends on their stock, thus

It enhances and steadies the values of telephone securities, making and keeping them a safe, desirable and profitable investment.

Our automatic system adopted in the following cities:

CHICAGO, ILL.
GRAND RAPIDS, MICH.
COLUMBUS, OHIO.
DAYTON, OHIO.
LINCOLN, NEB.
PORTLAND, MAINE.
AUBURN, N. Y.
LEWISTON, MAINE.
SIOUX CITY, IOWA.
CLEBURNE, TEXAS.
COLUMBUS, GA.
SOUTH BEND, IND.
ABERDEEN, S. D.
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LOS ANGELES, CALIF.
PORTLAND, ORE.
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CLAYTON, MO.
PENTWATER, MICH.
TORONTO JUNCTION, CANADA.
WILMINGTON, DEL.
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BERLIN, GERMANY.

AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets - - - - - CHICAGO, U. S. A.

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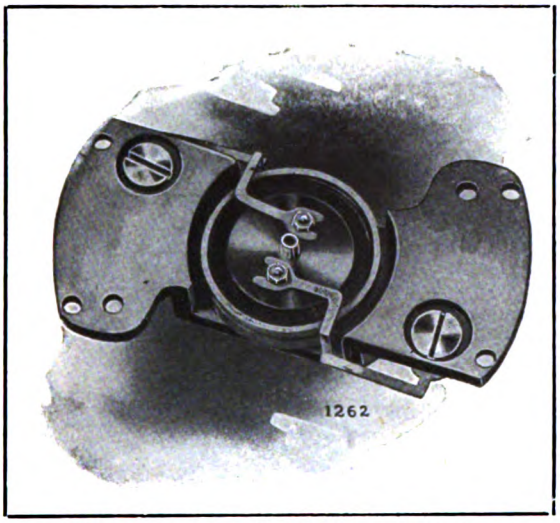
The Stromberg-Carlson Transmitter



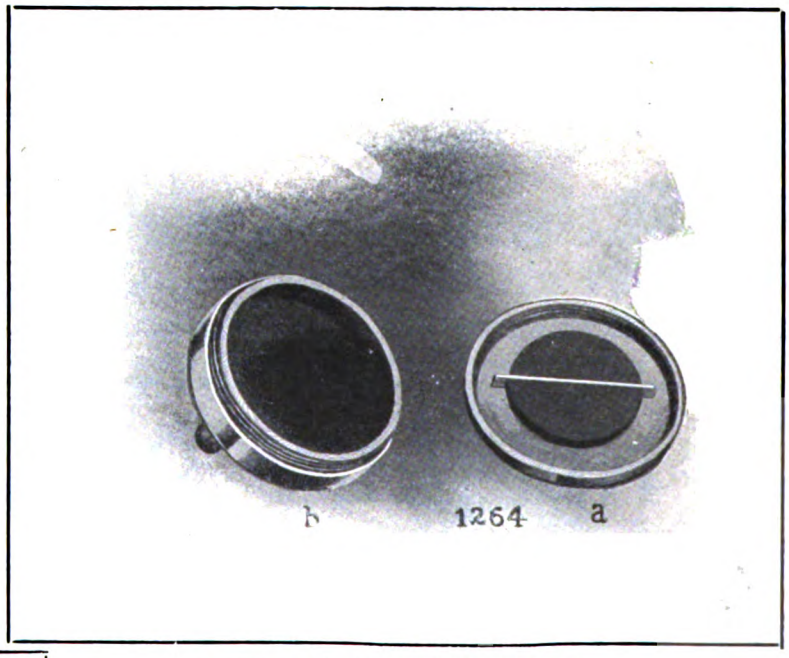
DIAPHRAGM WITH CONNECTORS AND CARBON CUP ATTACHED

Is decidedly different from any other you have ever seen. Different in ways that count for better transmission. This is quite noticeable when the transmitter is used on long distance lines. At a very slight cost you can prove this to your entire satisfaction.

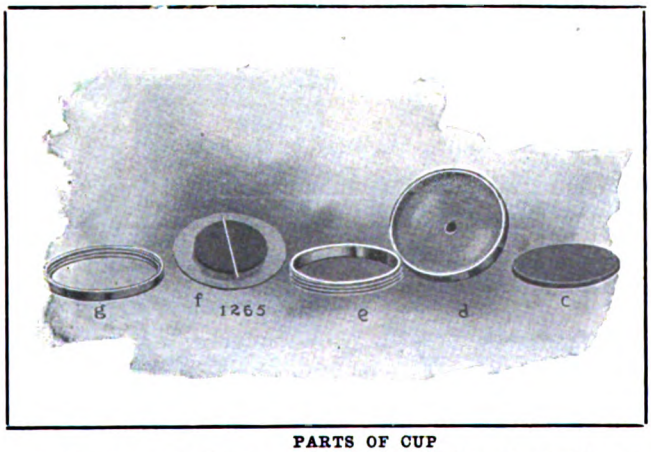
Why not do it?

THE ELECTRODES

Are made of carbon, and both are attached to the central point of the main diaphragm. There is thus produced a variation in the distance between the electrodes of twice the amplitude of variation of the central point of the main diaphragm. It is unnecessary to claim greater volume of transmission than if only one electrode moved.



CARBON CUP WITH CARBON REMOVED



PARTS OF CUP

We give the transmitter such an adjustment that under ordinary tones of voice the volume is not as loud as some of the forms of sensitive transmitters now on the market. As the voice is raised, however, the volume of transmission from the instrument is multiplied two-fold so that the transmission, when talking in a loud tone of voice, has much more volume than that of any other type. The advantage of this is readily seen.

Let us send you our new booklet describing and illustrating this transmitter. It tells the whole story; we mail it free. Just ask for Booklet No. 91-B.

Stromberg-Carlson Tel. Mfg. Co.

Rochester, N. Y. **Chicago, Ill.**

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WE MAKE CABLE

Cable Construction by One Who Knows

We append below a letter from C. H. Judson which we know will carry more weight than any arguments we could set forth relative to the merits of cable construction.

MR. C. H. JUDSON.

Mr. Judson's ability and judgment is well proven from the fact that he has been engaged by the following prominent Independent companies as construction engineer:

Twin City Telephone Co. . . . Minneapolis and St. Paul, Minn.
Kansas City Home Telephone Co. . . . . Kansas City, Mo.
Mutual Telephone Co. . . . . Des Moines, Ia.
Independent Telephone Co. . . . . Council Bluffs, Ia.

and is at present acting in a similar capacity for the

Independent Telephone Co. . . . . Seattle, Wash.

Mr. Judson says:

THE INDEPENDENT TELEPHONE CO., COUNCIL BLUFFS, IA.

COUNCIL BLUFFS, IA., May 24, 1905.

STROMBERG-CARLSON TELEPHONE MFG. CO., Rochester, N. Y.

Gentlemen:—In Des Moines, with an average of 1,100 operating lines, in the cable plant during the month of February, 1905, the actual cases of line trouble were 11; six of them being blown fuses and the balance various other troubles.

Of course this was a very rare month, but it shows how much line trouble can be reduced by enclosing all the line wires in cables.

The short open wire plant, which includes the short lines attached to the end of the cables where they run out through from one to four blocks, with one or two pairs, gave considerably more trouble than this, although there were probably less than 100 lines in this part of the plant.

Theoretically the only line trouble that a cable plant can produce is caused by actual damage to the lines, as burning of the cables or the breaking of the cables from extraordinary causes, or the breaking or accidental grounding of the rubber covered drop wires.

Another plant in which there were about 1,800 all cable lines working, showed during a very heavy storm about one-fifth as much line trouble as an absolutely new open wire plant of somewhat smaller size, in the same vicinity.

The situation can be figured out by any Exchange Manager if he will take his trouble sheet and sort it up carefully, setting out in one column the cases of trouble which occur in lines which are all cable, and in another column those which occur on open wire lines.

Very truly yours,
(Signed) C. H. JUDSON.

Have you a copy of our Cable Booklet? Ask for Booklet No. 79-B.

STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N.Y. CHICAGO, ILL.

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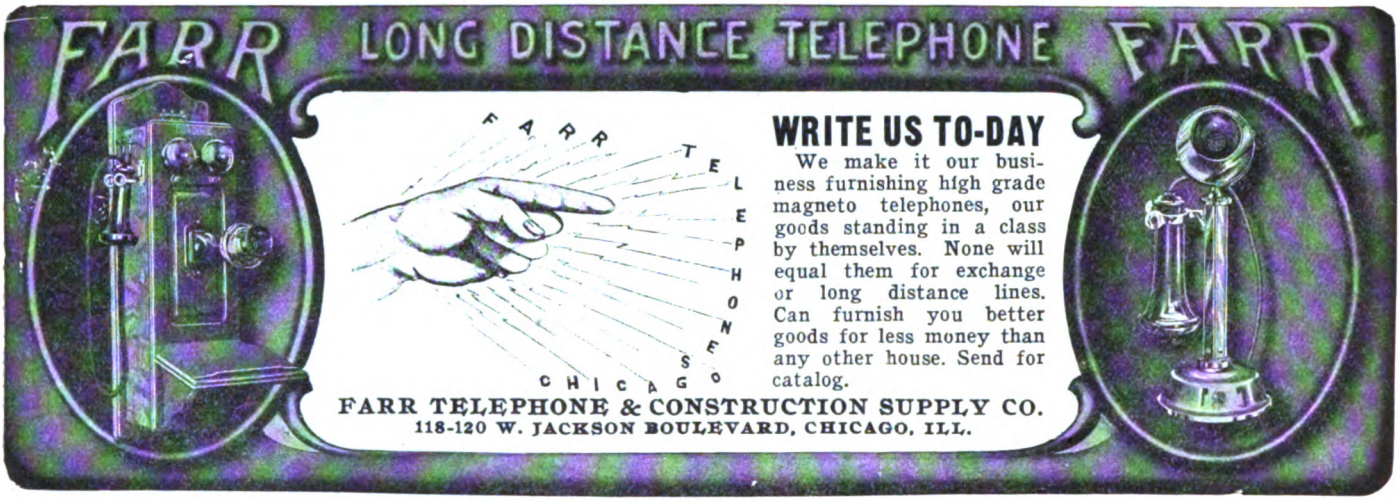

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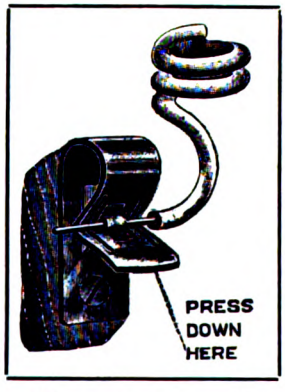

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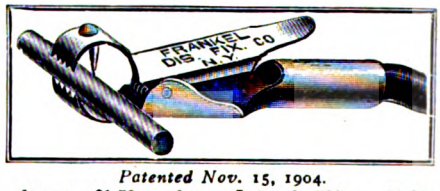

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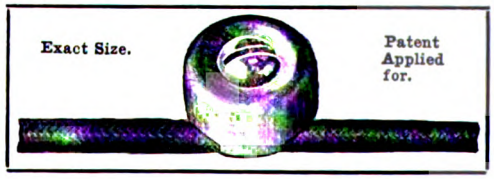

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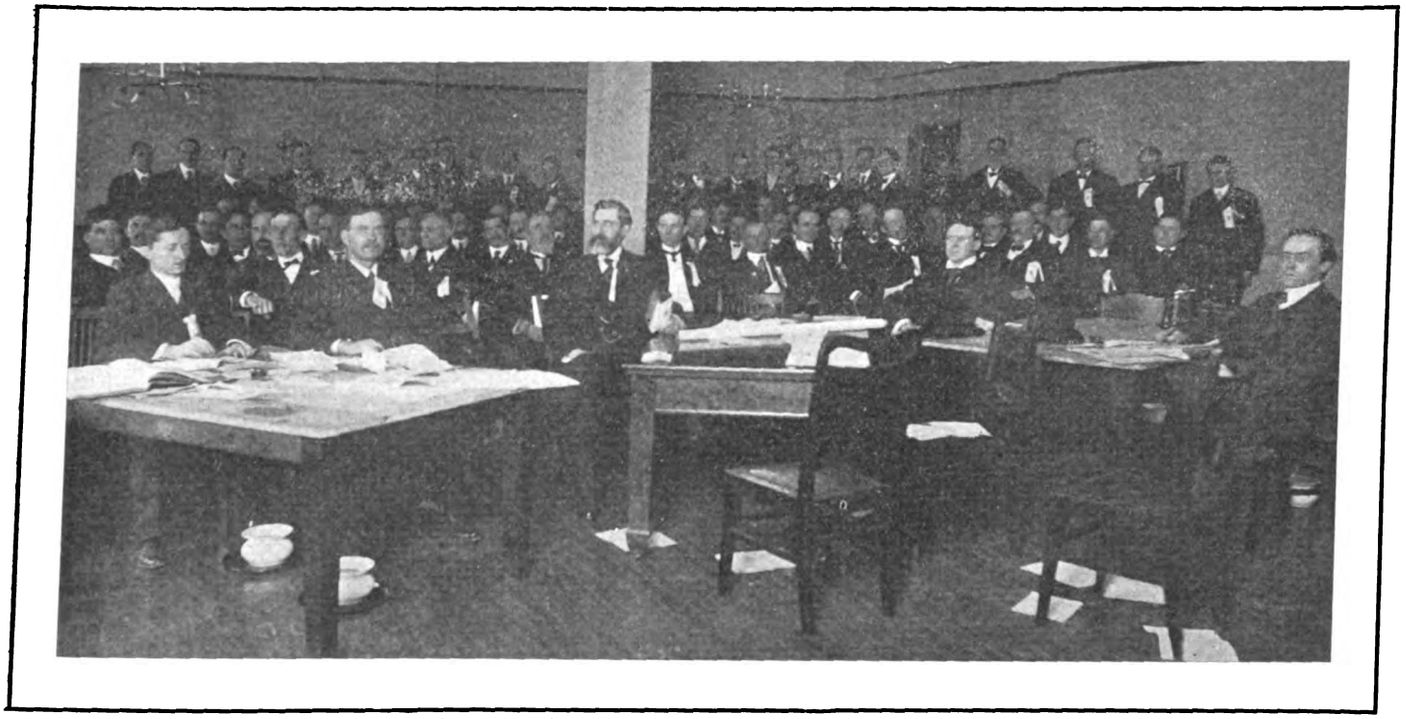
The Parkersburg Convention

By P. C. Garrard.

ATTENDANCE at the first annual convention of the West Virginia Independent Telephone Association exceeded the most sanguine expectations of those who have led in its organization, as there were during the different sessions about one hundred and seventy-five representatives of the various telephone companies throughout West Virginia, as well as of companies in counties bordering on West Virginia in Ohio, Pennsylvania and Maryland.

The association, which prior to the convention was composed of fourteen companies, accomplished at this gathering one of the main points that were desired, and that was to bring into the organization many of the smaller companies throughout the State that had not up to that time been members. Not only do the larger companies realize the strength that is to be gained by organization, but many of the smaller ones realize this as well and availed themselves of the opportunity of getting under the protecting wing of the association.



Delegates and Guests at the Annual Convention of the Independent Telephone Association of West Virginia, Held at Parkersburg.

At the opening of the convention President J. Walter Barnes, of Fairmont, read his annual address. After briefly alluding to the development of Independent systems, which began with the exchange established in 1892 at Clarksburg and grew from this small office into the Consolidated Telephone Company, which now operates in several counties, he stated that there are now eight or ten companies in the State which have a very large volume of business, and these, with their allied small companies, are doing much to cripple the Bell monopoly. He referred to the attempts at organization, which began in 1896, and have finally led to the development of the present strong association. The object of the association he stated to be to form such a union as will more firmly cement the Independent interests, to promote uniformity of operation, construction and equipment and to defend by co-operation the different companies and to give all moral and legal support in any aggressive movement against the common enemy; to procure the enactment of such legislation as will be to the best interests of the Independent companies; to interest home capital and home people; to devise ways and means to protect the companies against the attacks of the opposition and to give such aid by advertisments and maps as may be for the best interests of the Independent operators. He stated one need of the Independent telephone companies in this State to-day to be a traffic association, in order that an equitable division of tolls can be made between the companies for long distance business. Another object touched upon which is to be brought about by the work of the associated companies is the settlement of all disputes according to the rule recommended by the Board of Directors of the National-Interstate Telephone Association, that is by arbitration. The president stated that the Executive Committee has divided the State into districts, so that one member of the Executive Committee of the association is assigned to each district and that all matters and disputes should be filed with him. This member will call in two members from other districts to act with him. The proper dealing with rural lines or mutual telephone companies, the establishment of a committee on legislation and a committee on traffic, and the preparation of a map which will show all toll lines of the different companies with their connections each received consideration in his address.

The president summed up the situation in West Virginia in a manner which admirably indicated the way to improvement and

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stated in conclusion that "there is everything to encourage us to go forward to meet the competition that we have that is not of the fair, open sort which we like, but is covert and underhanded, even posing under the name of Independent companies in order that it may answer its ends."

The first paper on the programme following the president's address was that of Frank B. Hall, of Wheeling, on the subject of "Standard Construction," which was read by W. C. Handlan, of the same city.

In this paper were taken up the various classes of construction noticeable in use by Independent telephone companies. He suggested that the National Committee be authorized to adopt specifications for the various departments of construction and to adopt a standard of materials to be used. He urged strongly the standardization of construction in order that the Independent telephone system may be brought up to the highest state of efficiency.

Following the reading of the paper Mr. Handlan spoke of the benefits that had been derived by the National Telephone Company, of Wheeling, with which he is associated, in an expenditure of money for a high standard of construction.

He stated that they were able to give excellent service by reason of this between Wheeling and Pittsburg and with many points within a reasonable radius in Ohio.

At the close of the roll call Secretary Davis stated that the members of the West Virginia Independent Telephone Association have 17,271 telephones as against 7,832 Bell telephones in the same territory, the companies having 5,496 miles of metallic toll line circuits.

Representatives present from other telephone companies not in the association who were called upon for remarks were Mr. Doudna, of the Belmont Telephone Company, Belmont, Ohio; Dr. Smith, of Clarington Telephone Company, Clarington, Ohio; Dr. Jones, of the Athens Telephone Company, Athens, Ohio; W. H. H. Jett, Marietta Telephone Company; R. O. Wooster, Caldwell and Marietta Telephone Company; J. W. Marshall, Hartley Telephone Company; W. M. Haynes, Enterprise Telephone Company, New Martinsville.

Under the head of new business, W. C. Handlan offered a resolution, which was adopted, that the telephone companies in other States in counties bordering on West Virginia be invited to become associate members of this association.

A. C. Davis, of Parkersburg, made a motion, which was carried, that the president of the association appoint a committee of three on standardization to act with a like committee of the National-Interstate Telephone Association.

The last order of business for the afternoon was the appointment by the president of the regular committees, which were as follows:

Legislation and Litigation—Frank P. Moats, John A. Howard and A. C. Davis.

Resolutions—W. C. Handlan, J. U. Jolliffe and L. H. Bours.

Nominations—J. H. Lininger, B. J. Farrell and S. E. Billingston.

Standardization—W. C. Handlan, J. W. Downs and A. B. Kratz.

At the Thursday evening session, the address of welcome was delivered by Mayor D. H. Leonard.

The mayor spoke of the reception of the West Virginia Western Telephone Company in breaking the monopoly held in Parkersburg by the Bell Telephone Company. The people did not receive the local company because it was an Independent company alone, but because they felt the company would give them justice. He also mentioned the manner in which the Bell interests fought all movements to start Independent telephone lines in the courts and how these obstacles have been overcome by the energy of just such men as he was addressing.

At the conclusion of the response of President Barnes to the mayor's address the paper of James B. Hoge, of Cleveland, president of the National Interstate Telephone Association, was read by J. H. Lininger, of Harrisville. The subject was "The Future of Independent Telephony," and owing to the inability of the writer to be present, the reading of the paper was assigned to Mr. Lininger.

At the opening of the Friday morning session A. C. Davis, general manager of the West Virginia Western Telephone Company, of Parkersburg, took up in a manner which was much appreciated the matter of territorial rights. In regard to the question of establishing a right to develop territory, he urged Independent companies not to waste their energies by useless competition with other Independents. This involves the companies in difficulties which can only be solved by a proper division of property, which will give to each company the territory which it can best serve. If the companies interested cannot agree, they should select an arbitrator, whose action shall be final, compensating each company for such loss as it may incur. If the companies of larger size find it impossible for any reason to develop the territory adjacent to their systems, they should encourage the organization of a local company to construct lines, giving a fair contract for connection with the larger exchange. If no local people can be found to build up this adjoining territory, he urged that a neighboring company be induced to supply the territory upon a mutual contract for switching subscribers and the exchange of traffic. He closed his address with a vigorous denunciation of those who have betrayed their associates by entering into sublicense contracts with the Bell interests.

The paper on "Switchboard Operation" was prepared and read by E. K. Hertford, manager of the Charleston Telephone Company.

The discussion on this paper was opened by President Barnes, who spoke principally in relation to the wages of telephone operators. In this connection he advocated better pay for the operators and a careful selection of this class of employes.

At the close of this discussion the report of the Executive Committee on a matter that had been presented to them relative to the Burton and Mannington Telephone Company was called for. W. C. Handlan, of Wheeling, gave the report of the committee and in doing so he stated that complaints had been filed with the committee by the Cameron Telephone Company, the Wadestown Telephone Company and the Exchange Telephone Company, of Littleton, that the above company has lines on its switchboard that are not in harmony with the interests of the members of this association.

The committee has investigated the matter and, as stated by Mr. Handlan, the committee has notified the Burton and Mannington Telephone Company that unless it discontinues the connections with the lines complained of that all members of this association will discontinue service with it at noon on March 3. The report was adopted.

At the afternoon session on the second day the Committee on Nominations reported the following names: President, W. C. Handlan, Wheeling; vice-presidents, first district, J. H. Wise, Cameron; second district, W. M. Clayton, Parsons; third district, J. W. Downs, Buckhannon; fourth district, Hugh Amos, Burnsville; fifth district, Lon H. Hutchinson, Huntington; secretary, A. C. Davis, Parkersburg; treasurer, Lloyd Beeghley, Weston.

The officers named were declared duly elected.

The election of delegates and alternates to the convention of the National-Interstate Association resulted as follows: Delegates, Lon H. Hutchinson, W. C. Handlan and A. C. Davis; alternates, A. B. Kratz, E. K. Hertford and L. H. Bowers.

The Committee on Standard Construction was directed to confer with competent engineers relative to specifications for construction for use by companies in this association.

The first paper on the programme for the afternoon was that of W. C. Handlan, of Wheeling, on the subject of "Independent Telephone Securities," which was particularly interesting to the members of the association.

The next paper was read by Lon H. Hutchinson, of Huntington, his subject being "The Ideal Manager."

After all of the business that had been scheduled on the programme of the convention was completed on Friday afternoon President Barnes took occasion to call on a number of the repre-

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sentatives of telephone companies in adjoining States for remarks. Among those who responded were Messrs. McHenry and Holsher, of the Western Telephone Company of Cumberland, Md.; E. D. Schade, of the Johnstown Telephone Company of Johnstown, Pa.; Dr. Hart, of Pittsburg, superintendent of the long distance business of the Pittsburg and Allegheny Telephone Company; A. L. Gracey, of the Marietta Telephone Company; Dr. F. P. Ames, of the Home Telephone Company of Rockland, Ohio; L. L. Long, of the Mt. Morris Telephone Company of Mt. Morris, Pa., and Mr. Heinlin, of the Belmont Telephone Company of Bellaire, Ohio.

The convention adjourned without naming any place for its next annual meeting, but the call for that meeting will be by the Executive Committee.

As a fitting climax to the convention came the banquet which was given by the West Virginia Telephone Company, of Parkersburg.

Although many of the visiting telephone men had left during the afternoon and the early portion of the evening for their homes, there were about seventy-five who sat down to the banquet table to enjoy the hospitality of the local company.

J. Walter Barnes, the retiring president of the association, who was selected as the toastmaster of the evening, opened that portion of the evening's programme. His selection was a most appropriate one, and he filled that duty in a happy manner that was pleasing to all.

The first speaker introduced was E. D. Schade, manager of the Johnstown Telephone Company, of Johnstown, Pa., who responded to the toast, "Our Emblem." Mr. Schade spoke of the manner in which the emblem can be made popular. "One of the ways," he said, "is to interest as many people as possible in your community to become stockholders of your company.

"Pay annual dividends instead of investing all of the earnings in new equipment and your stockholders will then become interested and will all become solicitors for the company. Our company has tried this with success, and I know that it can be done."

Frank Hart, of Pittsburg, manager of the long distance lines of the Pittsburg and Allegheny Telephone Company, was next introduced and responded to the subject of "Far Away Talks."

Judge C. M. Showalter was the next speaker, who responded to the toast, "The Telephone Girl," and he spoke words of praise of the hello girl that would have done credit to the knights of old.

"The Kicker and the Kickee" was the subject assigned to E. K. Hertford, who said that he would admit that there were times when the public has a right to kick, but in the majority of cases the kick is due from the operator.

J. A. McHenry, of Cumberland, Md., responded briefly to "Our Host," in which he said that he had been much encouraged and would carry words of good cheer back to his people.

"Hot air talks" were indulged in by a number of the representatives of manufacturers, after which there were "cross talks" by a number of others and the programme was closed by A. C. Davis.

Mr. Davis responded to "Our Guests." He said it would not be appropriate to close this meeting without thanking those who had come from adjoining States, as well as from his own State. Prominent business men a few years ago took up the telephone business as a side issue, but they have now become so enthused over its prospects that they are taking an active interest in the business.

Telephone Engineering*

By J. J. Carty.

NOT so many years ago it was thought that the functions of the telephone engineer consisted of doing little more than to provide and install switchboards. He was supposed to be consulted occasionally about the station apparatus, and later, when cables were introduced, his activities were extended so as to include the testing of cable after it had been bought and laid.

J. J. Carty.

At the time of which I speak, telephone companies took almost an exclusively switchboard view of the telephone business. A building would be selected by someone connected with the company and the engineer would be consulted principally as to the selection of the switchboard and the placing of it in position. The size and location of the building, its relation to the existing and probable future subscribers, and all of the vast number of other factors now considered so vital in determining such matters, received but scant consideration. So it was with cables; whether the cable should contain wires of No. 22, No. 19, or No. 16 gauge; whether the insulation should be of cotton, rubber, or gutta percha—these were questions which were as likely to be settled by the purchasing agent as by the engineer.

To one acquainted with the conditions of those times this is not at all surprising, because the telephone engineer of that period shared with all of the rest of the world the prevailing ignorance concerning matters which have since been proved by laborious investigations to be governed by well established laws, the nature of which was then unknown.

Let us take the case of New York City, with the suburban territory tributary to it, and assume that it is the intention of the telephone company to install within that territory a telephone system which will work at a proper degree of efficiency and at the same time yield to the investor a fair return upon his investment; and that it is necessary not only that this condition should exist during the first stages of the project, but that the undertaking should be so managed that this condition will be maintained indefinitely. With such a problem before the telephone management, what part of it should the management require the telephone engineer to work out?

The first question which the engineer must decide is, what is the period for which such construction as may be required should be planned? This is a question of far-reaching importance and requires for its answer that a vast amount of data should be collected, and that careful and long-continued study and investigation should be given to a large number of factors, involving among other things, first cost and character of construction of the diverse portions of a plant of such complicated nature, annual charges such as maintenance, depreciation, and interest, and local conditions bearing upon the possibility of the renewal or extension at some future time of all of the elements of the plant.

In addition to this, due regard must be paid to possible changes in the art and also the fact that, owing to the exigencies of the business, many cases arise where it is necessary to carry out at the beginning, especially in underground work, all of the construction which may ever be needed.

At the outset the question of the period for which to plan depends upon the expectations of growth. With a given expectation of growth, the engineer, by taking into account all of the factors of the case, and balancing the annual charges

*Abstract from paper read before the American Institute of Electrical Engineers, February 23, 1906.

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resulting from the initial investment against the cost of reconstruction and rearrangement of the plant at some future time, arrives at the economical period for which to plan.

In this work the predictions as to growth are of the first importance and, inasmuch as accurate predictions of this kind are attended with the greatest difficulty, it is essential that not only the judgment of the engineer, but that of the business management and all others who might be able to advise in connection with the matter, should be obtained.

At this stage of the work it is of the utmost importance that the bearing of these estimates of growth upon the future of the plant should be thoroughly understood by the business management, whose functions, in the nature of the case, exercise such a profound effect upon the extent and character of such growth. It is the duty of the engineer to make this point clear and to obtain from the business management serious and responsible estimates of future growth.

The number of lines which may be expected having been agreed upon, the question of how long a period ahead we should plan is determined by a number of circumstances. For such conditions as obtain at New York, the period for much of the construction has been found to be from 17 to 20 years. This figure is arrived at by taking into account a large number of factors, such as life of the central-office switchboard, which is placed at about 15 years, the relative costs of placing in the subways a large number of ducts initially as compared with adding new ducts after a period of about 20 years, the uncertainty regarding the changes in the state of the art, and the difficulty of foretelling with sufficient detail conditions which are expected to obtain during a period so far ahead as 20 years.

Having determined upon the number of lines which form the proper foundation of the study, and having received the proper authorization from the business management to proceed on that basis, the next step is to plot on a map the probable distribution of these lines. This is done, not by giving the location of each line, but by indicating by blocks the most probable distribution. Here again the judgment of the engineer must be assisted and directed by the business management, for next in importance to determining the total number of lines to be provided for comes the question of their distribution.

The number and distribution of lines having been agreed upon, the next step is to determine the number and arrangement of central-office districts, the size and boundaries of these districts and the size and location of the central-office switchboards.

It is conceivable, although obviously impracticable, that all of the lines might be extended to one central office and operated in switchboards there; it is only necessary to state such a proposition to exclude it from further consideration. On the other hand, it is conceivable that a central office might be established in each block; this also is absurd and needs no further consideration. Somewhere between these two extremes must lie the most economical size and number of central offices. The next stage in the problem is to determine this number; to do this no formula, simple or otherwise, is available. The only practicable method is to lay out the territory to be served, in accordance with a number of different arrangements of districts and centres, starting in, say, with 10 centres and extending the study up to as many as 30 or 40, or even more. In the case of all these arrangements there would be certain elements of cost which would not be changed by the different arrangements of central offices assumed. Block wiring and station instruments are examples of these. These elements of cost are omitted from the comparison. All of the items of cost, however, which vary with the different number and arrangement of central offices are computed, all of these being reduced to annual charges.

From these figures, as applied to the various layouts, the number of central offices and the districts which are ideally most economical may be seen. I say ideally most economical for the reason that the practical application of such results requires that a difficult and very complicated adjustment of the existing plant, to conform as nearly as possible to the ideal condition, must be carried out.

Before the switchboard study can be made, general methods of operating must be agreed upon: such as the method of handling toll business, whether it shall be done wholly upon a toll board or partly upon a toll board and partly direct from "A" positions; whether it shall be done wholly upon a "two-number" basis or substantially upon a "particular party" basis. The best method of handling local business must be determined. It must be decided whether the business shall be upon call wires or otherwise; what shall be the capacity of the call wire; what shall be the load which will be assigned to the various operators in the system, this in turn being dependent, among other things, upon the character of the service which it is thought necessary to render.

Having agreed upon these and other fundamental data, the question of the best type of switchboard, whether it shall be full multiple or partial multiple, whether it shall be of the transfer type or otherwise, must be settled. The limit so far as size is concerned of the multiple board, or any other type which may be considered, must be determined. Also there must be settled a very large number of questions cropping out at every point involving maintenance and operating expenses and methods. All of these factors having been duly weighed, the maximum size and type of switchboard is agreed upon.

Of first importance in the cable study is the determination of the standard of transmission which is to be employed, not only for talk between offices within a zone such as Manhattan Island, but also the standard of transmission which it is necessary to maintain between Manhattan Island and the suburbs and between various points in the suburbs passing through Manhattan, and to long-distance points. The importance of this determination will appear when we consider the standard already adopted as the Manhattan standard, which is, assuming the use of the present common-battery apparatus, that the cable employed in Manhattan shall at all times be such that it will give in the worst case a talk as good as could be obtained between two central offices joined by a trunk cable of 10 miles of the standard type having the No. 19 gauge conductors, with a mutual capacity of 0.07. If this standard were lowered, so as to employ the use of No. 22 gauge cable instead of No. 19, it would permit the use of a trunk cable costing half as much as that required by the present standard, thus reducing the number of ducts required and in that way profoundly affecting the results of the study.

The general features of the study having been determined upon and the time having arrived to erect a given central office at a centre previously located, the question of obtaining the necessary real estate and erecting the central office building presents itself. In such cases it is usually impossible to obtain the desired property exactly at the ideal centre. Practical real estate conditions must be met and, of the various parcels of property offered, that is chosen which, taking into account all of the circumstances of the case, results in the lowest annual charges. The distance of a given site from the main subways, the character of the neighboring buildings, the price at which the property can be obtained, the possibility of reconstructing the existing building which may be upon the property or the necessity of removing it and erecting a new one, and other similar points—all these have to be carefully worked out before a report can be made to the management setting forth the most economical land to purchase.

Without attempting to outline in any detail the nature and extent of the work involved in the methods employed in making a suburban toll-line study, and without going at all into the question of methods of establishing the service to long-distance points, I will say that, considering the broad features of these various classes of conditions, it has been found best, in the particular case which I have taken for my example, to divide the telephone business into three classes; local, suburban, and long distance.

In determining what shall constitute the local class the engi-

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neer finds himself engaged in a problem of great magnitude which primarily concerns the business management and which is affected by important public and economic considerations as well as by engineering factors and methods. If the local zone is made too expensive it greatly increases the magnitude of the trunk-line plant from which no toll revenue can be derived. This fact reacts upon the rates in such a manner as to make it impossible to give as low a station rate as might otherwise be the case. This tends to restrict the growth of stations and hence will act as a check upon the growth of the business at large.

The local zones having been determined upon, it must next be decided what shall be the limits of the suburban business and what shall be classed as long-distance business. Without attempting to explain the various points necessary to be taken into account in determining these questions, I will say that they involve not only those physical factors ordinarily considered to constitute engineering, but that they involve the methods of calling which may be permissible on the part of the subscriber, the entire system of toll rates which may be adopted by the telephone company, the question of whether the subscribers' names and numbers should be listed or not, and other questions of this nature.

(To be Continued.)

Dummy Jack Crosswiring Record System for Distributing Frame

By Volney D. Cousins.

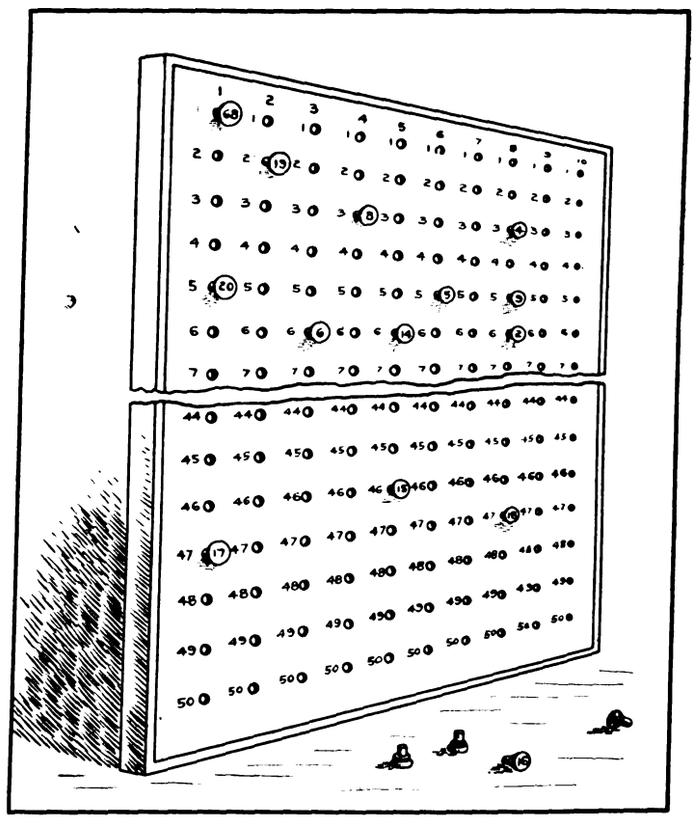
CONNECTIONS on the distributing board in a modern telephone exchange are recorded by the wire chief in accordance with a certain system. Current practice makes use of a ruled book containing two columns of numbers definitely assigned to this use. In one column are placed the numbers designating each pair of cable conductors which enters the office. The other column contains upon the same line with the number of a pair of cable conductors the number of the jack connected to this pair. The numbers assigned to the outside wires are usually stamped, and all erasures and changes which may be necessary are made on the other column.

If the company's business is rapidly increasing, or if subscribers are changing their residences, it falls upon the wire chief to make the changes in cross-wiring as fast as they are sent in from the linemen on the poles. A record must be kept of each change and later entered on the books. Three or four erasures in one place make a hole in the page and an adjacent column must be used. With all due respect to the wire chief, his hands cannot be kept clean during working hours, and his book will show the effect of the wear and tear it receives. If a company is rapidly adding new stations or suffers a gradual shifting of subscribers, the life of a book will hardly exceed a year, and will never show a creditable appearance. The cost of a new book may be small, but its preparation requires a great deal of time.

The dummy jack system, so called from its resemblance to the modern multiple jack, will do away with the old terminal book. This system consists of a set of banks of holes drilled into hard wood or sheet metal, and small plugs to fit these holes. Each bank contains, let us say, 50 holes or dummy jacks to correspond to the 50 pairs in a given cable. Then each vertical row of holes will contain as many numbers as there are pairs in the largest cable running into the office. Set into each hole is a plug containing the number of the telephone line which operates on that pair; i. e., the number of the jack to which the line is connected. These plugs when not in use may be kept in a drawer or separate bank, thus offering a quick method of finding an idle number. An idle pair may be chosen in a cable by a glance from the wire chief's desk. If a pair is in trouble this may be designated by a colored plug, which should be left in the jack until the trouble is cleared.

It is often convenient for the wire chief to know on which pair a certain telephone number operates. Another bank of dummy jacks similar to the first may be installed, each jack representing a telephone number and each plug bearing the cable pair number. In this case there should be a bank for each operator's position.

This system when properly made and installed should last indefinitely. Both sets of banks might be arranged behind a glass door, upon the wall of the exchange near the wire chief's desk. While it may be necessary to use a book for a record of the number of parties on a line, etc., this method will eliminate one of the most undesirable features of the book system and offer the advantage of quick reference. No attempt need be made to make a cost estimate as the system is capable of being very cheaply installed.



Record Board and Plugs. Holes bear numbers corresponding to cable pairs. Plugs carry line numbers.

EXTENT OF THE NEW INDEPENDENT PLANT FOR DETROIT PARTLY DETERMINED.

MANAGER W. B. WOODBURY, of the new Home Telephone Company of Detroit, Mich., in a recent interview stated that plans were being made for a system which would have an immediate capacity for 15,000 subscribers and an ultimate of 30,000. W. C. Polk, the engineer in charge, has already started the preliminary survey, and the actual work of construction will shortly be commenced. One million feet of conduit have been ordered for delivery April 1, and other construc-

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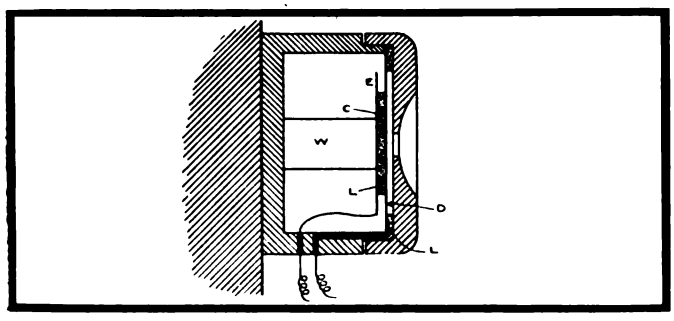
tion material will be supplied to enable the plant to be completed with the least possible delay.

The question of rentals will not be decided until an estimate upon the cost of construction has been submitted, but it is certain that they will be equitable. Mr. Woodbury, until recently, was assistant general manager of the Cuyahoga company in Cleveland, and his experience in that position will prove of great value in the operation of the new Detroit company.

A HOME-MADE TELEPHONE CURIOSITY.

By Arthur Kneisel.

TWO ingenious Kentucky farmers who lacked the necessary funds to join a mutual company built a line of their own. For insulators the necks were broken from medicine bottles and spiked to trees, being held in place by leather washers. The line wire, which ranges from hay bale wire to No. 9, runs for three-quarters of a mile, not a pole being used. The accompanying photograph will give a fair idea of one instrument.



Construction of home-made transmitter.

The receiver and bell were evidently procured from the junk pile of some telephone company. The transmitter, which is entirely home-made, is shown in a sectional view. *D* is a diaphragm, made of the lid of a paint can. L. L. are leather washers, one to hold the diaphram in place, the other to hold the carbon granules, *C*. *F*. is the back electrode, made of a tin lid. The hook is made of a piece of No. 9 iron wire bent double and soldered together part of its length, the two ends forming the prongs. The induction coil, which is also home-made, is wound on the spool of a flax-spinning wheel. Strange to say, the instrument talks.

MEETING OF THE FOURTH DISTRICT OF THE ILLINOIS INDEPENDENT TELEPHONE ASSOCIATION.

INDEPENDENT telephone men of the fourth Illinois district, composed of Iroquois, Ford, Livingston, McLean, DeWitt, Piatt, Champaign and Vermilion counties, gathered at Bloomington, Feb. 23d. for their first convention.

In his address of welcome Mayor J. S. Neville congratulated the telephone men in having cut the rates in two and doubled the service.

Manford Savage, of Champaign, made an address in response, which summed up the benefits conferred upon the country in a manner which makes it one of the most admirable pieces of telephone literature which has ever been composed. This address has been printed and will be distributed by the association.

B. F. Wasson, of Clinton, in a brief address called attention to the problems which the telephone manager has to solve in order to keep abreast with the progress of his business. Talks were also given by J. C. Kelsey, of Chicago, on "The Sub-License Game in Theory and Practice," and by C. B. Cheadle, of Joliet, Ill., secretary of the Illinois State association, who spoke on "Financial Phases of Independent Telephony." The question box was conducted by William Corwin, of Lincoln, and E. D. Childress of Farmer City.

The following delegates were present: W. H. Ramsey, Auburn; F. Y. Hamilton, Bloomington; B. F. Wasson, Clinton; C. H. Coffman, Clinton; C. E. Costley, Weldon; E. D. Childress, Farmer City; F. J. Cutting, Clinton; I. C. Sabin, Clinton; Manford Savage, Champaign; T. C. Bate, G. H. Glass, Pekin; F. M. Kelly, Springfield; H. H. Davenport, Chicago; Wm. Buehrig, Minier; E. M. Ford, Elyria, O.; Wm. Gaddis, Colfax; E. C. Martens, Bloomington; Hart F. Farwell, Bloomington; Maro Farwell, Bloomington; C. S. Hankins, Decatur; W. B. Murke, Decatur; R. C. Critchfield, Minier; Evan Shelby, LaFayette, Ind.; L. F. Hyneman, Lexington; H. A. Ball, Gibson City; H. R. Means, Saybrook; W. W. Lane, Arrowsmith, and C. E. Roberts, Chicago.

MARCH MEETING OF THE PITTSBURCH SECTION OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

ON March 13 telephone men will speak at the meeting of the Pittsburgh section of the American Institute of Electrical Engineers. The members have expressed much pleasure at being able to hear a paper by W. W. Dean, vice-president and chief engineer of the Dean Electric Company, Elyria, O., on "Harmonic Signalling." Five minute discussion papers will be presented by the following gentlemen:

S. P. Grace, chief engineer, C. D. & P. Telephone Company; S. G. McMeen, consulting engineer, Chicago; R. A. L. Snyder, construction engineer, C. D. & P. Telephone Company, Pittsburgh; L. Muhlheizler, superintendent of maintenance, Pittsburgh & Allegheny Telephone Company; M. C. Rorty, superintendent of Traffic, C. D. & P. Telephone Company.

The meetings of the Pittsburgh section have been particularly well attended this year. The institute has secured the use of the new auditorium of the Carnegie Technical School, which is centrally located, and the convenience of this is much appreciated by the members. The students of the Pittsburgh schools have been invited to the meetings, and apparently have been much interested. This meeting, bringing together, as it does, so many of the leading telephone men in the country, is likely to produce most valuable results.

PROPOSED REGULATION OF TELEPHONE BUSINESS IN BRITISH COLUMBIA.

A BILL has been introduced in the Legislature of British Columbia which gives to every person, association or company operating a telephone line the right to connect with the line of any public company, and such public company is to be obliged to receive and transmit messages from any connecting line in the same manner in all respects and with the same rights and liabilities as in the case of messages received by the public company in the regular course of transacting business.

Arrangement of Telephone Made by Kentucky Farmers.

Provision is made for rents to be paid to, and the rates to be charged by the public company for the use of its lines by these private connecting lines, such rates to be fixed by the Government in unincorporated districts, and by the municipal councils in incorporated districts at their pleasure. This is getting down pretty close to Government regulation of rates, and rents may be expected to be as reasonable as they would be under municipal ownership.

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QUERIES

DISTRIBUTING FRAME TROUBLE.—(669.)

All our lines coming into the exchange, pass through a ¼ ampere fuse, through a paper wrapped cable, then to a terminal head through heat coils which are to open on 5-10 amperes and thence through another cable to the board.

The other day our board became so noisy that it was impossible to use it. On going up to the cross-connecting racks and terminal head, sparks were seen spitting from between the carbons. In touching the frame I received a shock that sent me to the floor. I looked for the trouble and found that an electric line carrying 6,000 volts had fallen during the storm on one of our wires crossing it and had melted our wire solid to the electric light wire. When we cut the line in question our trouble stopped. Now I would like to know, why did not the ¼ ampere fuse blow open or the heat coil operate. Could this not have burnt out the cable? What could have been the cause of neither fuse or heat coil opening? E. H. C.

The experience which our correspondent details is what we should expect if the ground connection on the main distributing frame were defective. This is evident from the fact that current passed from the frame through his hand and out to ground through his feet.

Under these circumstances there is no reason why the heating coils or fuses should operate as the failure of the carbon arresters to provide a low resistance path to ground for the current from the electric light wire would prevent the operation of any protective devices which depend on flow of current to operate them. The sparking in the carbons noted was probably caused by the high potential to which the frame was charged seeking a path to ground through the electrostatic capacity of the other lines in the exchange.

This experience is a very good illustration of the extreme danger which may arise not only to exchange employees, but also to subscribers by allowing the ground connection of the main distributing frame to become defective.

TROUBLE WITH GRAVITY BATTERIES.—(670.)

In one of our offices we have in use four cells of gravity (bluestone) batteries, upon which a regular froth forms. It is not the ordinary scum as usually seen on this style of battery, but a froth, and has a very strong odor. The batteries will be working all right one night, and the next morning will be "dead." Do you think the water would be the cause of it, as the office is situated in a copper camp? We forward a sample of the water for examination. G. C. H.

Laboratory tests upon the sample forwarded show the following results:

	Parts per Million.
Total solids	339
Ignited residue	257
Volatile (organic) matter	82
Iron	2

There was a color of 55, and the residue showed the presence of considerable amounts of carbonates. The amount of total solids points to a hard water evidently owing its hardness to the carbonates held in solution. This water is evidently a highly colored, hard, surface water containing some organic matter and iron in amounts above the normal.

Considering the hardness of this water and the presence of carbonates, the trouble is likely to be due to the action of the acid formed in the processes of the gravity battery upon the carbonates. Carbonic acid gas would thus be liberated and cause a mixing of the copper and zinc solutions, and hence a destruction of the potential difference dependent upon surface contact only of the solutions. The gas liberated would cause frothing if there were present some organic matter of a nature such as to produce this effect. There were found microscopically considerable fungi (filamentous) present. These often have slimy envelopes about their sheaths, which would easily account for the frothing.

To avoid this trouble it is suggested that the water be boiled with the addition of about one-half teaspoonful of soda to each three or four gallons of the water. The boiling should be kept up for fifteen minutes and the boiled water should then be allowed to stand for 12 to 14 hours until a deposit settles. The water may then be decanted and used. In this way the acid alkaline earth carbonates that are held in solution by an excess of carbonic acid gas will be precipitated and at the same time the water will lose its acidity due to this gas.

CALL COUNTER.—(671.)

Will you please tell me if there is any device for indicating by electrical means the number of calls received on a line where a measured service system of charging is in effect? R. E.

SOME companies use what is known as a service meter. This is an electro-magnetic instrument, which is intended to be operated by the pressure of a button. There is provided one of these instruments for each line. The instruments are all grouped together in the terminal room, mounted upon a rack.

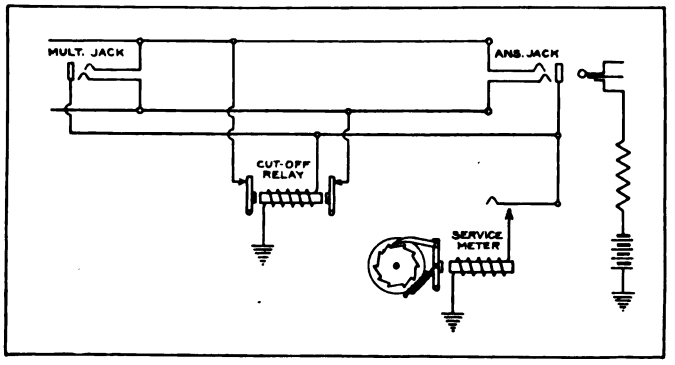

Fig. 671.

Cabling from the meters is run to the intermediate frame, where connection is made with the switchboard circuits. The circuit is so arranged that upon the pressure of a button the current is caused to pass through the service meter coil, and the magnet attracts an armature. The motion of the armature causes the rotation of a disc, bearing figures, through one-tenth of its circumference. Several wheels are provided, each of which bears the figures 0 to 9 upon the circumference. These wheels are geared together, and a complete rotation of the unit wheel causes the advancement through one space of the wheel devoted to tens, etc. The total number of calls for the line in question is thus displayed at all times by the indicator.

In Fig. 671 is shown one of the methods which has been devised for the operation of these signals. With this plan a key is associated with each answering jack at the switchboard. The operator makes the connection called for and, as soon as the supervisory lamp associated with the calling cord is extinguished, she knows that communication has been established, and presses the button of the calling line, causing the wheel to rotate through one division. Another plan provides for the operation of a meter by a key located in the keyboard, and associated with the cord circuit. With this arrangement the meter is connected directly to the sleeve of the answering jack. Although the inserting of the plug in the jack causes the passage of a current from a 24-volt battery through the meter it is not sufficiently strong to operate the device. The pressing of a key in the cord circuit, however, causes a special 30-volt battery to be connected to the sleeve circuit, and the current passing from this through the meter is sufficient to cause the attraction of the armature.

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THE EDITOR'S PAGE

MR. CARTY'S PAPER.

RAPIDITY of progress is one of the most striking features in the development of modern telephoning engineering. No more emphatic method of pointing this out could be imagined than the choice for an address by the foremost operating telephone engineer in the world, to be given before the leading body of electrical engineers, of a subject which enables the author to sketch, for their information, the duties of the man responsible for the working of a telephone plant. Engineers in general are just waking up and taking an interest in this distinct branch which has so rapidly come into a position of the greatest importance.

Mr. Carty's paper is likely to serve for a long time as the standard by which outsiders will judge the telephone engineer. To those engaged in the work of which he speaks the treatment of special cases, and the expression of opinions based on his own most useful experience, make the paper one of exceptional interest and value. Amongst these subjects is that of the measured service method of charging, in favor of which he declares in the most unqualified terms. It is only to be regretted that he has not given, for the benefit of telephone men, a more detailed statement of the evils which he has found to be overcome by this policy. The value of careful consideration before taking even preliminary steps toward the construction of a plant is another point upon which he dwells in a manner that reveals the force of his dislike for unscientific and unbusinesslike work. Unavoidable errors of large dimensions, he asserts, are so likely to occur, even when the utmost care is taken, that no information bearing upon a particular case should be left unconsidered.

The discussion of the relation of the engineer to the business management serves at once as an outline of responsibility, and as a suggestion of the need of the most thorough and hearty cooperation between the engineering and business departments. A number of practical instances are given to emphasize this point, and attention is drawn to the fact that a plant which has been designed to provide for economical operation under certain methods of handling business and certain rates, may be very far from the correct thing if the management sees fit to introduce even a slight modification in the original plans.

The pointing out of the breadth of telephone work, and the number of separate classes of knowledge with which some familiarity is essential, is a feature of the paper which must be interesting to men engaged in other branches of engineering. This part of the paper from one who knows the things of which he speaks should carry a useful hint and some encouragement to the younger men who are looking forward to the accomplishment of the most valuable work in their careers.

Hitherto there has been no comprehensive, well stated outline of the duties and responsibilities of an operating telephone engineer, and Mr. Carty's present paper, like others which he has prepared, will take a leading and permanent place in telephone literature.

TOLL LINE SERVICE.

INDEPENDENT toll lines are being extended throughout the country in a way which promises to soon unite all the small companies into a most effective system. Ohio, Indiana and Illinois have thousands of miles of first-class metallic circuits which provide most satisfactory facilities for the transmission of messages between towns in all parts of these states. From these highly developed centers extend lines controlled by the companies operating in these states, or their allies, which lead into many towns in New York, Pennsylvania and West Virginia. In each of these states there are numerous large and well organized companies, which have so thoroughly covered the territory in which they operate that they are able to furnish a great deal of business to the toll lines. Further growth of this branch of the business is well assured. Kentucky is being served by a well developed company, and lines are rapidly being built throughout the South, so that within a short time it will be possible to obtain connection from extreme southern states to Chicago over as good lines as can be built. The secretary of the Nebraska Association has recently announced that in a year's time lines have been built in his state which provide for intercommunication among systems which serve thirty-five thousand subscribers, and the number of persons who can be brought together is being rapidly increased by the building of additional lines. Iowa is served by so complete a system that it has been necessary to organize an association for handling the large business, and the effect of an equitable method of dividing the receipts is sure to give an added impetus to the toll line growth in this state. Fully as significant as the large systems, which give so comprehensive and satisfactory service in the Central States, are the projects which are under way, and which are managed by organizations giving every assurance of the successful termination of their plans, for the rapid extension of long distance service beyond its present limits. The new company which has recently been organized in Arkansas will supply connection between companies in a region which is well developed in a local sense, but where facilities for toll service are greatly needed. Extensions in this direction will interconnect with lines in Texas, which state already has numerous toll lines between its own cities.

Communication from Utah to the Pacific coast is said to be assured through a recent contract which gives Independent subscribers the benefit of lines and rights of way along the Great Western Railway. In the extreme northwestern states Independent development has recently been going on at an extremely rapid rate. Large systems are in operation in the more important cities and towns, and to these are connected a great number of rural subscribers. Those who control these plants are now making arrangements for connection with districts lying to the eastward, and there is every prospect of the speedy development of an extensive Independent system in the western part of the country which will be able to compete on more than equal terms with the toll lines of its rivals.

The value of this work, which is being so rapidly and thoroughly carried on, lies not so much in the advantage of being able to hold an occasional conversation over an extremely long line, but rather in the fact that conversation between a great number of places separated by moderate distances may be had over good lines. Instead of numerous switched connections, each one of which takes time and reduces the efficiency of transmission, it will be possible to obtain connection over from one hundred to five hundred miles by means of direct lines. If these lines are well designed and well constructed, they will give not only the assurance of efficient service for each call, but will also secure to Independent subscribers the other great necessity of freedom from interruption in bad weather. The result of this work cannot fail to be the production of a most beneficial effect upon the industry at large.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HEIGHT OF WIRES FROM STREET LEVEL IN PENNSYLVANIA.

Will you kindly let me know what the distance is from the level of a street to the height of a telephone line; that is, how high must a telephone line be so as not to interfere with public travel? J. L. P.

THE only regulation that there is on the subject you inquire about is that the telephone line shall be of such a height as not to interfere with public travel. What that height is depends in every case upon circumstances, such circumstances being the road and what it is used for. It is the duty of the telephone company to determine this for itself in each case, and if it has put its line at a reasonable height it will be protected from liability thereby.

UNINCORPORATED TELEPHONE COMPANIES.

Can an unincorporated telephone company put up pay stations along its line? Can a like company take subscriptions from parties not stockholders in the same company? F. H.

IF an unincorporated telephone company can conduct a telephone business at all, it certainly may use pay stations in so doing. Corporations have no greater rights in the transaction of telephone businesses than have individuals. An individual may, if he sees fit, obtain a franchise and conduct a telephone business, and there is no reason why a number of individuals acting together as a partnership, or unincorporated telephone company may not transact business in the same way. It is not necessary that all subscribers to the company become stockholders therein. The stockholders may permit persons not the owners of stock to become patrons of the company, without turning over to them any interest in the company. The answer to both of your questions is "yes."

CITY FRANCHISES UNNECESSARY IN TENNESSEE.

THE Nashville Home Telephone Company, which is compelled to obtain a franchise from the city of Nashville, is said to be considering the feasibility of installing a telephone system in Nashville under a law passed in 1885, which confers on the telephone companies the right of eminent domain. The law may be found in Chapter 8, of Shannon's Code of Tennessee. Two sections of it are as follows :

"1830. Any person or corporation organized by virtue of the laws of this State, or of any other State of the United States, for the purpose of transmitting intelligence by magnetic telegraph or telephone, or other system of transmitting intelligence the equivalent thereof, which may hereafter be invented or discovered, may construct, operate and maintain such telegraph, telephone or other lines necessary for the speedy transmission of intelligence along and over the public highways and streets of the cities and towns of this State, or across and under the waters, and over any lands and public works belonging to this State, and on and over the lands of private individuals, and upon, along and parallel to any of the railroads or turnpikes of this State, and on and over the bridges, trestles or structures of said railroads. (1885, Ch. 66, Sec. 1.)

"1832. In the event such telegraph or telephone companies should fail, upon application to such individuals, railroads or turnpike companies, to secure such rights of way by consent, contract or agreement, then such telegraph or telephone corporations shall have the right to proceed to procure the condemnation of such property, lands, rights, privileges and easements in the manner prescribed by law for taking private property for works of internal improvement. (Id., Sec. 2.)"

It is under this law that the American Telephone & Telegraph Company is operating in Nashville and other towns of the State, the law being specifically referred to in its charter. Some doubt as to the constitutionality of the law has been expressed, and the United States District Court in the case of the East Tennessee Telephone & Telegraph Company v. Greenville, declared the law unconstitutional on the ground that the journal of the House of Representatives did not show that it was signed by the Speaker in open session. The case was subsequently carried to the Circuit Court of Appeals, but dismissed by that court for lack of jurisdiction. The law has never been passed upon by the Supreme Court.

PENALTY FOR REFUSING TO RECEIVE A MESSAGE.

AN action was brought by D. S. Pollard against the Missouri & Kansas Telephone Company to recover a penalty of $200 under the terms of section 1255, Revised Statutes, 1899, relating to the duties of telegraph and telephone companies. The defendant demurred to the plaintiff's petition alleging that it did not state a cause of action. The statute under which suit was brought read:

It shall be the duty of every telegraph or telephone company, incorporated or unincorporated, operating any telephone or telegraph line in this State, to provide sufficient facilities at all its offices for the dispatch of the business of the public, to receive dispatches over and for every telephone or telegraph line, and from and for any individual, and on payment or tender of their usual charges for transmitting dispatches as established by the rules and regulations of such telegraph or telephone line, to transmit the same promptly and with impartiality and good faith, under the penalty of $200 for every neglect or refusal so to do, etc.

The statute originally applied only to telegraph companies, but in 1879 was amended so as to couple telephone with telegraph companies. The court held that the statute was penal, and should not receive a strained construction. The charge was that plaintiff desired to communicate by conversation directly between himself and another person. The court held that this statute did not cover such a communication, but meant a written dispatch delivered by the sender to the agent of the company. Judgment for the telephone company was accordingly affirmed.

Pollard v. Mo. & Kans. Telephone Company, 90 S. W.; 121.

TO LIMIT PARTY LINES TO FIVE SUBSCRIBERS.

THE Louisiana Railroad Commission has proposed a rule forbidding telephone companies from connecting more than five telephones on any party line. The Cumberland Telephone Company has been cited to appear before the Commission when the case will be taken up.

The following is the rule proposed for adoption:

"No telephone company operating in Louisiana shall hereafter be allowed to connect more than five telephones on any party line in cities or towns of the State or on lines running into the country. The rate established by the commission for party line service shall apply only when this condition is complied with. Should any telephone company place more than five telephones on any one party line then the rate for such service for each and every party on such line shall be one-half of the rates authorized for party line service."

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IN THE OPERATING FIELD

BILL FOR TELEPHONE RATE REGULATION IN OHIO RECEIVES UNIVERSAL OPPOSITION.

THE House Committee on Cities in the Ohio Legislature has been granting hearings to telephone men on the Hillenkamp bill, which authorizes the councils of cities and villages to regulate and fix by ordinance the price and rate of telephone service every seven years and the granting to such cities and villages of free telephones not to exceed twenty-five. The Independent telephone companies have been active in opposition to the bill and have compelled three hearings.

At the first hearing Clarence Brown, attorney for the Home Telephone Company, of Toledo, and James S. Brailey, president of the company, appeared and addressed the committee. At the second hearing Hon. Harry M. Daugherty, attorney, of Columbus; Frank L. Beam, president of the Ohio Independent Telephone Association, and W. L. Cary, attorney for the Cuyahoga Telephone Company, Cleveland, made arguments against the bill. At the third Frank A. Davis, attorney for the Columbus Citizens' Telephone Company; Judge Gilbert H. Stewart, for the Central Union, and President Richardson, of Indianapolis, representing the Central Union Company also, appeared and urged the defeat of the measure in committee. It is thought perhaps the bill will not be reported back at all, the argument of the gentlemen being conclusive against the proposition.

Many other telephone stockholders and representatives heard the arguments, which created considerable interest and discussion. The general trend of the argument by the Independent speakers was to the effect that such a measure would stifle competition, would corrupt city bodies and would in general tend to more or less successful attempts of Independent and trust telephone companies to unite in many localities and to pool their issues in others. It was stated that the passage of this measure would precipitate fights which would not tend to reduce prices to patrons, but would increase them by increasing the cost of introducing the systems and by wholly preventing systems from entering many cities. It was shown that the condition of affairs in Ohio, where the number of telephones had been increased from forty-five thousand to over the million mark in ten years, is most excellent. That the people are generally satisfied with the rates is shown by the avidity with which they seize on a chance to avail themselves of them and put in the valued improvement.

City Solicitor Northup, of Toledo, is the only advocate of the bill who has yet appeared on the affirmative side, and it is claimed that he is the real author of the bill, the trouble between the city and the telephone companies in Toledo being the ground of his action in the matter. The measure is proving exceedingly unpopular as the people gain an insight into its provisions and the motives behind them.

MANITOBA LEGISLATURE TAKES FIRST STEP TOWARD GOVERNMENT OWNERSHIP OF TELEPHONE SYSTEMS.

THE days of the Bell Telephone Company in Manitoba are numbered. By an almost unanimous vote the Legislature of that Province has decided in favor of municipally owned exchanges, with government owned long distance lines. Application will be made to the Dominion Government for full powers to expropriate the Bell Company's lines and the following resolution to this effect was carried: "It is desirable, in the interests of the people of Manitoba, that the government of the Province should be able to construct or acquire and to maintain and operate a public telephone system or systems throughout the Province so as to insure reasonable charges for the use of telephones and uniform service throughout the Province and the more rapid extension thereof in every portion of the Province. Therefore be it

"*Resolved,* That an humble address be presented to his excellency the governor general and a memorial presented to the honorable the Parliament of Canada praying for the passing of an act amending the act of incorporation of the Bell Telephone Company, and the acts amending the same, removing all such doubts, and providing that the government of Manitoba, when authorized by this House, may lawfully expropriate the property, franchise and business of the Bell Telephone Company or any other company, firm or individual or municipality owning or operating any telephone system in the Province of Manitoba."

This resolution was the result of the visit of the telephone committee of the Manitoba Legislature to a number of cities in the United States. The report made by this committee showed that telephones could be installed and maintained in Manitoba for less than half the price now charged by the Bell Company and even at the greatly reduced figures a handsome profit could be made. It is the intention of the Manitoba Legislature to complete arrangements with regards to the government ownership and control of rates of telephones so as to have the new system working satisfactorily by the next Provincial elections.

GREENE AND WASHINGTON COUNTIES, IN PENNSYLVANIA, TO HAVE COMPLETE INDEPENDENT SERVICE.

EXTENSIVE improvements in telephone facilities in Greene and Washington counties, it is said, are being made by the Pittsburg & Allegheny Telephone Company. Franchises have also been secured in Glassport, Donora, Canonsburg, Waynesburg and Charleroi. A similar ordinance is now before the Council of Monessen. Work has been going on for some time in Waynesburg. At Charleroi the P. & A. will make connection with the Tri-State Telephone Company. The interests identified with the Tri-State have secured control of the Carmichaels Telephone Company, whose principal holdings were in Greene County, and are making extensive preparations to go ahead with the construction of a system that will cover that county completely. The section up the Monongahela River is the only one remaining in Western Pennsylvania which is not tapped at every important point by Independent telephone systems. The P. & A. is already operating a line to Donora. It now sends messages between Charleroi and Brownsville by means of the lines of the Tri-State Company, and it is thought that the gap between Charleroi and Donora will soon be closed. It is understood that Waynesburg will be connected with Washington by a P. & A. line, this giving complete service between the Greene County capital and all the towns in southern Washington County.

INTERESTING EXAMPLE OF INDEPENDENT DEVELOPMENT IN WASHINGTON.

THE Ewartsville Telephone Company, of Pullman, Wash., is owned and operated by farmers on the co-operative plan. This company is now extending and improving its service, and will soon run wires to Pomeroy, in Garfield county. It has 120 miles of wire in operation, and has scores of telephones in the homes of farmers, as well as connection with the business houses of Pullman and Colfax. As soon as the line is completed to Pomeroy it is the intention to extend a line to Dayton and Walla Walla. This extensive telephone system, entirely controlled by farmers, had its origin in a telephone line composed

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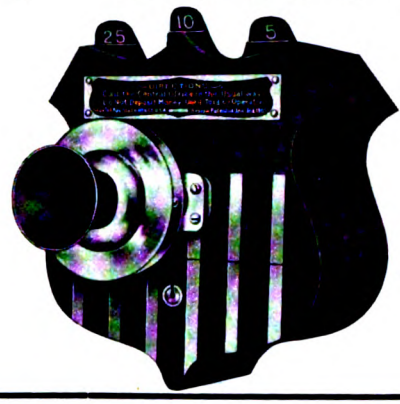
About Discarding Those Stations

With Getting Out of Order Parts

Others Had To



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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—1,800 line, multiple, lamp signal, Central energy switchboard of latest Stromberg-Carlson make. Just from the factory. Not yet unpacked. Terms to suit. Also modern telephone exchange and electric light plant in progressive South Carolina town of over 2,000 inhabitants, $14,000; $3,000 cash; balance on easy terms. Piedmont Electric Co., Anderson, S. C. 563

THE Armstrong Telephone Exchange Company wishes to bond their company for $5,000, and wishes to correspond with any company who is interested in making loans. Address R. O. Armstrong, Secy., Truman, Minn. 568

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

A SQUARE deal is what we aim to render both employer and employee, when seeking the right man for a place, or the right place for a man. Without effort on your part, without endangering your present position, and without using your employers' time, we hunt up the position for which you are best qualified. Let us find the positon for you. Hapgood's, Suite 511, 309 Broadway, New York City. 464

WANTED—By telephone manufacturing concern, competent telephone engineer, one who can design and construct apparatus. Fair salary to right man and excellent chance for advancement. Address Box 558, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 558

WANTED—Two experienced inspectors for central energy system in middle west. Must be hustlers and well recommended. Address Box 564, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 564

WANTED—Practical telephone man desires position as assistant superintendent or troubleman. Eleven years' experience. Best of references. Address Box 560, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 560

WANTED—Continued.

WANTED—Position as manager. Have had 14 years' experience in all branches of the business from the ground up. Past eight years have managed and superintended construction. Married and temperate. Very best of recommendations. Address M., 2119 A, Cass avenue, St. Louis, Mo. 552

WANTED—Position as manager, superintendent or wire chief. Eleven years' experience; good, all-around telephonist. Can take complete charge of from 1,000 to 2,000 subscribers. Address G. W. J., manager Home Telephone Company, Uhrichsville, Ohio. 547

WANTED—Position as manager, exchange 3,000 to 5,000 subscribers; eight years' experience in the Independent field; understand the telephone business from the ground up; competent and reliable. Can furnish adequate references as to qualifications, habits, etc. I will guarantee to "deliver the goods" in exchange management. Address Box 559, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 559

WANTED—Position as manager or wire chief. Have had five years' experience. Am a good all round telephone man. Can give all necessary references. Address, Box 565, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 565

WANTED—Experienced switchboard repairmen for central energy system in Illinois town. State previous positions held and salary expected. Address, Box 566, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 566

WANTED—Wire chief for Central Energy system in middle west; state experience in this class of work. Address, Box 567, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 567

WANTED—Correspondent. Must be able to write strong, forceful letters—the kind that turn inquiries into orders. Experience in dictating telephone and switchboard letters on magneto and non-multiple central energy apparatus necessary. Will pay good salary to right man. Give full particulars. Largest Independent company. Address, Box 562, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 562

WANTED—Chief operator for prosperous Independent company in Southern city. Splendid opportunity for right party. Address Box 569, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 569

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of wire fences connecting three farmers' homes with the town of Pullman. The system now is on a firm financial basis, and in addition to paying for the extension of its lines has a snug surplus in the treasury.

EXCELLENT CONDITION OF INDEPENDENT COMPANY AT BELLEVUE, OHIO, SHOWN IN ANNUAL REPORT.

DURING the past year 221 new subscribers were added to the system of the Local Telephone Company at Bellevue, Ohio, making a total of 2,845 telephones in service. These figures were disclosed in the secretary's report, which was read at a meeting of the company held on the 15th of January. This company at the present time owns and operates

		INDEPENDENT.				BELL.		
County	County Seat	Number of Telephones	Number of Exchanges	Number of Toll Stations	Number of Stockholders	Number of Telephones	Number of Exchanges	Number of Toll Stations
Hamilton	Cincinnati	0	0	0	0	20,000	5	10
Hancock	Findlay	1,386	2	1	24	1,800	1	0
Hardin	Kenton	2,505	8	5	165	200	2	18
Harrison	Cadiz	1,186	9	26	206	134	1	7
Henry	Napoleon	1,019	7	10	32	4	1	8
Highland	Hillsboro	1,612	9	14	116	778	6	9
Hocking	Logan	600	1	5	42	205	1	1
Holmes	Millersburg	1,123	26	47	140	0	0	21
Huron	Norwalk	2,756	10	23	300	650	1	20
Jackson	Jackson	0	0	0	0	525	4	15
Jefferson	Steubenville	1,887	18	26	443	520	2	7
Knox	Mt. Vernon	2,509	8	27	143	820	2	8
Lake	Painesville	3,129	16	30	665	768	4	20
Lawrence	Ironton	74	1	3	8	678	4	16
Licking	Newark	3,752	10	18	201	1,120	2	15
Logan	Bellefontaine	3,302	14	35	204	276	1	16
Lorain	Elyria	3,574	13	4	243	293	1	7
Lucas	Toledo	9,679	4	103	245	3,061	3	0
Madison	London	1,744	5	22	66	211	1	11
Mahoning	Youngstown	2,924	7	11	65	2,030	4	3
Marion	Marion	2,880	8	4	155	2,000	12	0
Medina	Medina	1,549	10	14	320	154	1	9
Meigs	Pomeroy	3,225	17	10	3,225	0	0	3
Mercer	Celina	2,268	15	18	1,248	0	0	19
Miami	Troy	4,914	13	25	310	188	4	18
Monroe	Woodsfield	646	6	8	14	10	1	4
M'tgomery	Dayton	5,365	7	11	401	6,500	4	2
Morgan	McConnellsville	1,300	2	9	10	0	0	1
Morrow	Mt. Gilead	1,600	12	8	30	54	3	0
Totals.		68,508	258	517	9,021	42,979	71	268

Comparative table of telephone situation in 30 Ohio counties. This is a continuation of the statement prepared by President F. L. Beam, commenced in our issue of March 3.

eleven exchanges at the following points: Norwalk, Chicago Junction, New Washington, Berlin Heights, Wakeman, Greenwich, New London, Monroeville, Plymouth, Milan and Attica. In addition to these there are toll stations at the following places: North Monroeville, New Haven, Centerton, Havana North Fairfield, Sulphur Springs, Ruggles, Boughtonville, Pegtown, North Auburn, Fitchville, Florence and Bismark.

A new toll line has been built from Norwalk via North Fairfield and Fitchville to New London and a direct line between Fairfield and New London has recently been placed in service. These toll connections are the completing links in the chain of circuits which unite all the exchanges in Huron County.

PROGRAMME ANNOUNCED FOR IOWA CONVENTION AT DES MOINES.

THE programme for the State meeting of the Iowa Independent Telephone Association, to be held on March 13, 14 and 15, is as follows:

President's address; reports from district organization; "The Best Method of Handling Subscribers' Toll Accounts," by H. A. Douglas, Cedar Rapids; "Better Long Distance Connections," by C. H. Smith, Sioux City; "The Clearing House," by George T. Hewes, Des Moines; "Our Friend, the Farmer," by Dr. Nelson, Dayton; "Care and Maintenance of Equipment," by R. A. Walker, Iowa Falls; "Managers' Experiences," by G. T. Everett, Columbus, Neb.; "Our Needs in Iowa," by E. E. England, Mt. Pleasant; "District Organization," by Chas. C. Deering, Boone; "Toll Service," by Geo. N. Bandy, Des Moines; "A Press Bureau," by Geo. E. Atkinson; "Tactics of the Opposition," by J. H. Shoemaker, Waterloo.

A large attendance is expected and those who visit the convention are assured of a pleasant and profitable session.

OBITUARY.

THE death of Pearl T. Spencer has removed from the ranks of Independent telephone men a zealous worker and a beloved associate. The members of the California Independent Telephone Association, with the progress of which he was so intimately connected, have passed the following resolutions:

WHEREAS, It has pleased Almighty God, in His infinite wisdom, to remove from our midst our esteemed and worthy brother and secretary, Mr. P. T. Spencer; and

WHEREAS, In his death the Independent Telephone Association of California loses a true and loyal member and his family a loving husband, brother and son; therefore be it

Resolved, That we extend to the family of our late brother our heartfelt sympathy in this their sad hour of bereavement; and, be it further

Resolved, That a page be set aside in our minute book for the spreading of these resolutions; and, be it further

Resolved, That a copy of these resolutions be forwarded to the family of our late brother and a copy sent to THE AMERICAN TELEPHONE JOURNAL for publication.

D. S. PARKER, Vice-President.
A. L. ORTON, Secretary.

SPECIAL MEETING OF IOWA INDEPENDENTS RECENTLY HELD TO CONSIDER NEW CONSTITUTION.

BURLINGTON, IA., was the meeting place for forty delegates of the Southeastern Iowa Telephone Association, who came together to consider the adoption of a new constitution conforming with that of the National-Interstate Association. About one-fourth of Iowa, comprising twenty-three counties and having 40,000 telephones in operation, in addition to 1,200 miles of toll lines, is represented by the Southeastern Iowa Telephone Association. The subject of toll lines was discussed in an extremely interesting paper by Geo. T. Hewes, manager of the Independent Telephone Clearing House of Des Moines. The Independent companies of Iowa now have 2,800 miles of toll lines in operation. They are much stronger in Iowa than the Bell Telephone Company. According to statistics given at the meeting, the Bell Telephone Company has but 26,000 telephones in operation in the State, while the Independent companies have a total of 126,000 telephones in use.

In speaking of the importance of Independent companies to Burlington, Mr. Fowler, secretary of the association, said: "The Independent lines are of immense importance to the wholesale houses of Burlington, as it gives them access to hundreds of little towns which the Bell Telephone Company has no connections with. It is well known that wherever a merchant has a telephone he telephones in orders to the larger cities, so the wholesale houses reap the benefits of the extension of the telephone systems.

"In regard to the fight that the Bell Telephone Company is making on the Independent people, it is not scaring us any, as it has been on for several months, and has not done us any damage: instead, we have been increasing right along. The Independent companies are the stronger in Iowa, and will be able to survive any force which is applied by this company."

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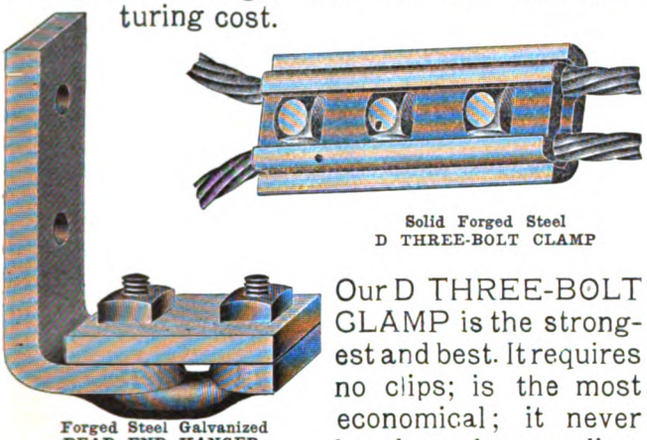
Look at our DEAD END HANGER. At a glance you can see the simplicity of design, the great strength and the low manufacturing cost.



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D THREE-BOLT CLAMP

Forged Steel Galvanized
DEAD END HANGER
(Patented)

Our D THREE-BOLT CLAMP is the strongest and best. It requires no clips; is the most economical; it never breaks and never slips.

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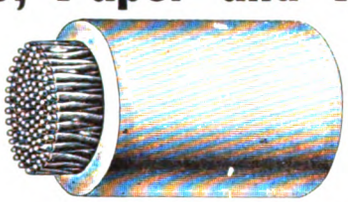
Cables, Paper and Rubber



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how fast your system will grow. If you are building farmers' lines, you may not see the necessity for more than ten lines and order a switchboard accordingly. Then when the system outgrows the capacity of the board, you have got to get a larger one. Why not save part of the first expense until your are able to get a good idea of the possible expansion by using

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They never become useless, for even after you install a regular board you can find lots of uses for them. Another good point about them is that they can be installed and maintained by anyone. You don't have to know a thing about the small points that are essential in the operation of a regular switchboard, and there is nothing to get out of order. If you are interested, let us know, and we will show you how to make money from the start.

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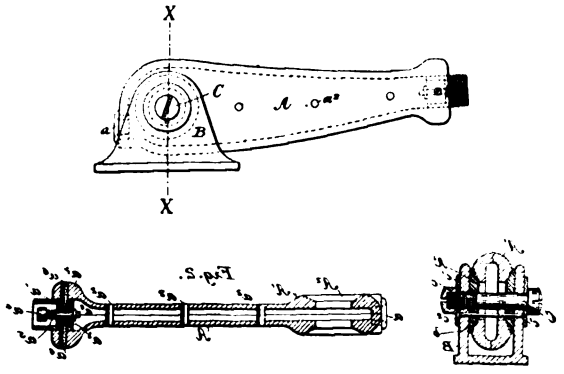
TELEPHONE PATENTS

TRANSMITTER ARM.

William D. Gharky, Philadelphia, Pa., patents (No. 812,125; dated Feb. 6, 1906; filed Mar. 7, 1901; serial No. 50,258) a transmitter arm.

The essential features of this invention consist of designs in manufacture which reduce the cost of production and in the employment of special contact mechanism for connecting the circuit wires to the transmitter. The body of the arm consists of two castings A joined together by rivets. The rearward end is enlarged and provided with exterior concave depressions which terminate in a central opening A^2. The base B is threaded in the usual way to receive a pivot bolt C. Two friction rings b are provided which fit into the depressions of the arm. A pin c^3 pre-



vents the movement of the rings. It will be evident that with this construction much machine work is eliminated as the bearing surfaces of the friction rings hold the arm in position. That end of the arm to which the transmitter is to be attached is provided with an enlargement a^7, to which is fitted a nipple a^1. An insulating block a^3, closing the rear end, is drilled to receive a plunger a^4. A spring a^5 is inserted between the head of the plunger and the insulating block. To the point a^6 one of the transmitter wires is attached; the other being fastened to the nipple a^1. This construction requires a special form of transmitter which is provided with a threaded boss to engage the threads of the nipple. Contact is made with the insulated contact of the transmitter by means of the spring bearing a^4.

SEMI-AUTOMATIC EXCHANGE.

Arthur M. Thomson, London, England, patents (No. 809,232; dated January 2, 1906; filed October 6, 1905; serial No. 281,713) a semi-automatic telephone exchange system. This invention relates to that class of system in which the subscriber causes the number of the connection desired to be visually instead of orally indicated to the operator by mechanical means, the operator not being provided with talking apparatus. Her sole duty is to connect the line of the calling subscriber with the one called. To accomplish this result the subscriber's instrument is furnished with a sending device operated by an electro magnet and clockwork. This sender is provided with individual levers for units, tens, hundreds, thousands. Just above the lever mechanism are openings through which numbers are disclosed so that when a subscriber calls a party before the call is actually sent in the combination of numbers will be in plain sight. Still further above is an oblong opening through which a set of printed instructions can be made to appear for the guidance of the party calling. These instructions may read as follows: "Exchange called, Call received, Engaged (busy), Please speak," and it will be apparent that they conform to the general terms used by an operator in handling a call in the usual way. At the exchange the subscriber's line terminates at the usual jack and is provided with a signal, such as a lamp. Numerical indicating devices are provided which the operators attach to the calling line to ascertain the desired number and connection is made by a modified form of the usual cord circuit.

The operations involved in securing a connection are as follows: The subscriber arranges his sending levers until the number desired appears in the openings above mentioned. He then winds up the clockwork mechanism by means of a crank, and in so doing closes a circuit to ground which causes the line lamp at the exchange to be illuminated. The operator then connects to the line the signal receiving mechanism and causes the instruction annunciator to display the sign "Call received." The introduction of the receiving apparatus causes mechanism within the subscriber's sender to operate and circuits are completed which cause the several figures of the number desired to be disclosed through an opening in the front of the signal receiver. Should the operator be in doubt after removing the receiving mechanism from the circuit as to the exact number desired she can restore the connection of this mechanism to the line and cause the number to be again recorded. The number of times this act can be repeated depends entirely upon the stored up energy of the clockwork mechanism, the arrangement of the sending levers not being disturbed. If the line desired is busy the operator causes the "busy" sign to be disclosed at the subscriber's instrument, and when the party desired is ready to talk, the "please speak" instruction appears.

Ringing is accomplished automatically by inserting the plug in the jack of the called party and a similar signal is simultaneously given to the calling subscriber. Supervisory lamps indicate the completion of a conversation in accordance with the usual practice on manual boards. This is a brief outline of operating features of the system. The invention requires 19 sheets of drawing and 35 separate diagrams to illustrate the mechanism, therefore we would suggest that all parties requiring a more detailed description secure a copy of the patent.

TELEPHONE POLE.

James M. Perdue, Matthews, Ga., patents (No. 811,435; dated Jan. 30, 1906; filed July 11, 1905; serial No. 269,244) a telephone pole.

The essential feature of this invention consists in the employment of sectional members which can be fastened together to secure any height of pole desired. For this purpose the inventor employs a plurality of rods which are held in position by means of head and foot plates. The sections required for the top and bottom of the pole are specially designed for that purpose, the intermediate sections being alike. The top plate of the top section is provided with means whereby an extension shaft carrying cross-arms can be securely attached to it.

In the process of assembling the various sections are joined together by hinged couplings so that when the structure is being taken down the operation of disengaging one member from a lower can be more readily accomplished by allowing the upper section to hang downwards while the pivot pin of the hinge attaching it to the section below is being withdrawn.

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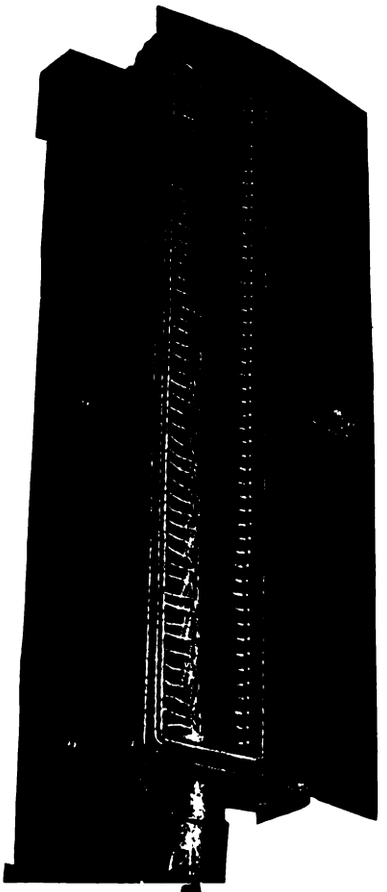

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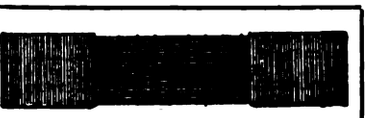
These terminal heads are made on scientific principles from specifications of the most experienced telephone engineers. No part is slighted to save expense. Reasonable in cost. Spider wires are allowed plenty of space and do not cross fuses. Rubber gaskets between lid and terminal head. Solid brass castings with which to make joint between cable and terminal head. Fuses of novel construction and placed directly above wide brass ground plate, making a practically absolute protection against lightning, trolley or electric light current.

Can be used for both a pot head and fuse terminal, as we equip each terminal head with a screw plug at the top to permit of same being filled with cable compound, if desired. Our method of construction, however, does not make this necessary, as the "Becker Terminal" is made moist-proof. The distributing terminal connections are square-head nickeled brass screws that pass *through* the spring clip which holds the fuse, entirely *through the iron case,* insulated with hard rubber bushings, being threaded and held firmly to position by brass nuts on inside, and are drilled to admit the wire from the cable, soldered connections being made direct to screw. This form of construction positively prohibits any turning or loosening of contacts.



No. 1 "Central" Patent Fuse used in Becker Terminal Head.

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GOOD OPERATING AND GOOD STOOLS ARE INSEPARABLE

Every manager is constantly endeavoring to increase the speed and efficiency of the service. Did you ever stop to think how much depends upon the comfort of the operators? Sitting in front of a switchboard eight hours a day is no snap, and when the seat happens to be one of the old style lumbering affairs made out of wood it's no wonder that a girl gets tired before the day is over. What is required is a seat that is flexible, one that automatically adapts itself to the movements of the operator and which instead of being an instrument of torture will be restful. In short a

Chicago Metal Frame Operator's Chair

This is the only stool made which solves the seating problem. Independent back and seat adjustment. Seat revolves without changing the height. Flexible back. Extreme lightness. Extremities of legs provided with rubber feet to insure quietness. These are some of the most striking features which will appeal to you. There are others which we can tell you about. Write to-day.

Patent applied for.

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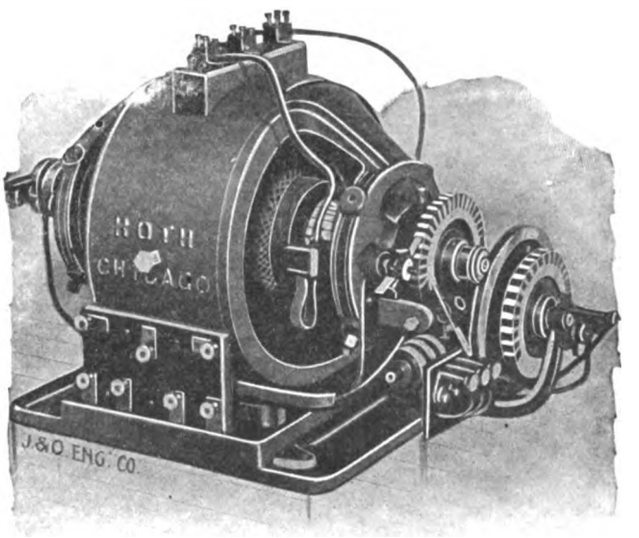

GOING TO ENLARGE YOUR PLANT?

If so you will need new power apparatus. In selecting it you should be governed by first cost, maintenance cost, efficiency and capacity. Here is where we can help you. We have been making power machinery for telephone exchanges for years—in fact, we are pioneers in this work. We have the most approved tools and we have a system which eliminates every unnecessary cost in manufacture. Because of these facts and our engineering ability you will see more **Roth Generators** and motors in telephone exchanges than all other makes combined. Our knowledge is at your disposal and we can save you time, worry and money.

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CONSTRUCTION APPLIANCES.

ECONOMY and security are the two things most necessary to obtain in hanging cable. Any device which will hold the cable firmly in position, which does not deteriorate too rapidly on exposure to the weather, and which enables the cable to be rapidly fastened to the messenger wire, deserves the most careful consideration from telephone men.

The Yonkers Specialty Company, of Yonkers, N. Y., claims that its Metropolitan Cable Clips hold cable securely, and will last as long as the supporting strand. The company makes two types, which are clearly illustrated in Fig. 1. It will be seen that with both types of hanger shown in this photograph, after the clips have been placed upon the cable practically only a single movement is required to place them on the messenger wire and clamp them. Once they are in position, the strain of the cable is said to lock them so securely in position that no displacement is possible. For pole line work the cable is run out on temporary supports with either hooks or cable blocks, and the clips are applied from a chair which runs along the supporting strand. This work can be done quickly and accurately, and a uniform sag in the cable suspension secured without difficulty.

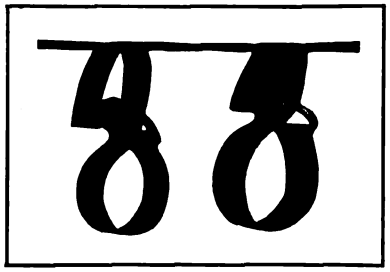

Fig. 1. Types B and A of the Metropolitan cable clip.

The steel wire loop shown in type A is heavily galvanized. The band which encircles both the cable and the supporting strand is of zinc. A high degree of durability is claimed for this combination. In the type B clip especial attention has been devoted to the preparation of a hanger for aerial cable which shall fulfill the requirements of cheapness and durability in a high degree. The simplicity of this hanger enables the company to offer it at a low price, and, as it is constructed entirely of zinc, it does not deteriorate from rust. In hanging cable with this type of clip the hooks which engage the slots should be bent up tightly, either with the fingers or by means of pliers. The bend of the zinc strap over the supporting strand should be made so that the lower loop, through which the cable is run, will be drawn tightly about the cable. This adjustment is easily and quickly made, and a firm suspension is secured.

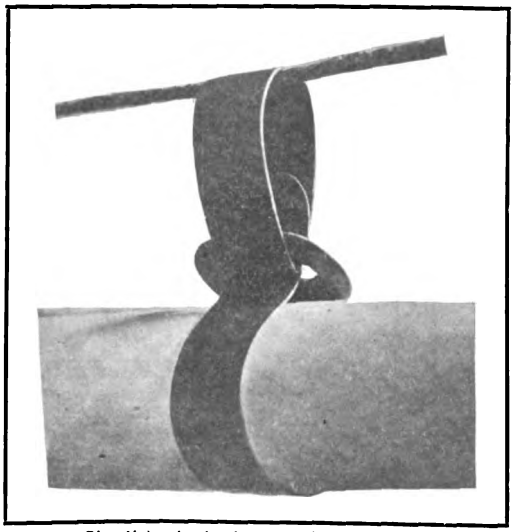

Fig. 2. Simplicity is the feature of the Metropolitan clip, type B.

Another appliance which has been widely used, giving a high degree of satisfaction, is the New York Wire Connector. In Fig. 4 the construction of this extremely useful piece of apparatus is clearly shown. The basis of the device consists simply of a brass stud carrying a slot to receive the wires. Two washers, which have a bar across the middle to engage the slot, are provided for clamping the wires. The screw which engages the thread on the inside of the stud clamps the combination securely together. In installing the main line wire is placed at the bottom of the slot; next a washer; then a branch wire upon which is placed the second washer. The form of the washers is such that ample bearing surface is secured, as when the screw is forced into the stud it not only causes the wire to bind against the washers, but exerts sufficient pressure to cause the firmest contact to be made between the outside circumference of the stud and the inner surface of the washers. As the bearing surface is so large a firm pressure can be exerted upon the wires without danger of injuring them, and yet, on account of their small size, the connectors may be readily taped if it is desirable.

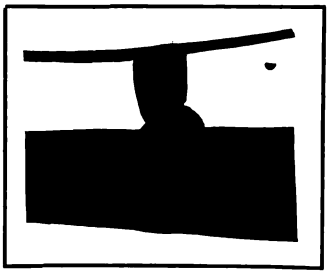

Fig. 3. Type A. The greater the strain the stronger the grip.

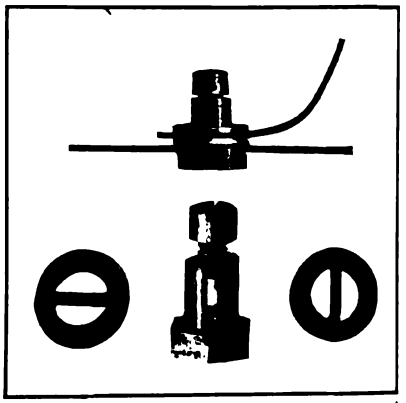

Fig. 4. New York wire connector, separated and in use.

THE FAHNESTOCK ELECTRIC COMPANY, manufacturers of the Fahnestock double diaphragm transmitter, and the well-known Fahnestock spring binding post, has removed from 132 Havemeyer street to 129 Patchen avenue, Brooklyn, N. Y. It is now located in larger quarters, which will enable it to more conveniently handle its business, which has been rapidly increasing.

THE WESCO SUPPLY COMPANY, St. Louis, Mo., has issued the first number of Vol. 5 of its publication "The Live Wire." In this issue a number of interesting articles are presented, including one upon trolley history in Texas. In the department devoted to new things there are descriptions of a live wire indicator, a new telephone which dispenses with the use of one hand to hold the receiver and a new armature winder. A photograph of the sales force of the company is also included, together with several pages devoted to descriptions of apparatus which the company has for sale. This magazine is issued once a month and will be sent to any person interested free of charge.

THE GRAY TELEPHONE PAY STATION COMPANY, Hartford, Conn., has recently issued a catalogue of toll equipment for public and measured telephone service. In it is described every type of automatic coin collector manufactured by the company, together with a line of registers for private or party line, and public pay station equipment for street installation. Twenty-one different models of automatic pay station equipment are shown; the list including coin collectors to meet any require-

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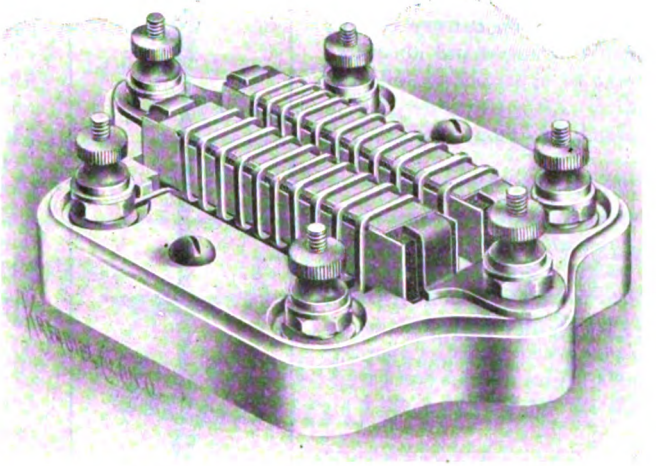
In Summer Protect Your Telephones with the Mason Multi-Discharge Lightning Arrestor



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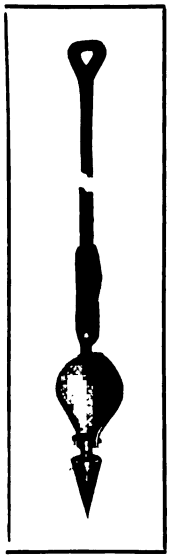
ments. The Gray registers are intended for use on measured service circuits, and combine a visual register and signal by means of which the operator is informed when the call has been recorded. Five different types are shown, one of which is operated by electricity and is designed for common battery circuits exclusively. The catalogue is excellently arranged and illustrated with numerous half tones. Each piece of apparatus is fully described and accompanied by a net price. All parties interested in pay station service are requested to send for a copy.

A NEW GUY ANCHOR.

ILLUSTRATIONS of an improved guy anchor are shown upon this page. This is a new type of the well-known D. & T. anchors, made by the D. & T. Anchor Company, La Crosse, Wis. Two sets of blades are provided to give a double grip and greatly increase the tension which may be put upon the device when installed. The form of the blades when folded is approximately conical, which has been found to give the anchor exceptional driving qualities.

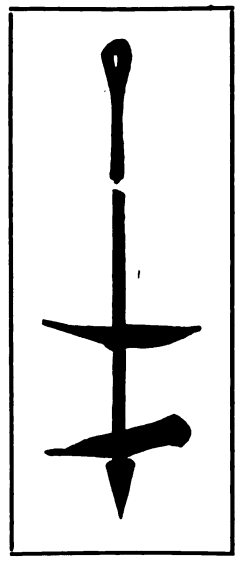
THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., is distributing to its customers bulletins Nos. 38 and 39. The former number is devoted entirely to a description of the Mason lightning arrester. This arrester differs essentially from any other on the market, in that the line wires are wound around the carbon ground block in a square formation. On account of the high self induction which this construction offers to the passage of high frequency currents, and the number of points for the dissipation of the discharge, the manufacturers claim this to be the safest ever devised. Bulletin No. 39 deals with telephone apparatus. In the preface the company emphasizes the fact that every part that enters into a complete telephone is manufactured by it, and therefore it is able to give an unqualified guarantee. Six types of wall instruments are shown for magneto service, besides the standard common battery set and desk instrument. Two separate pages are devoted to descriptions of the transmitter, receiver and generator, and the other parts also are dealt with fully. The latter part of the bulletin is devoted to general information of interest, and includes descriptions of the more common causes of troubles and their remedies. Illustrations of the right way to make transpositions, to connect up series and bridging telephones, and to install batteries are included. These bulletins contain, besides convincing arguments relative to the different prices of apparatus, much general information, which greatly adds to their value. All parties desiring copies should send their names at an early date.



D. & T. Anchor, ready to drive.

THE STERLING ELECTRIC COMPANY of Lafayette, Ind., is installing 1,800 lines additional switchboard capacity for the Toledo Home Telephone Company, Toledo, Ohio; 300 additional for the Lima Telephone Company, Lima, Ohio; 300 additional for the Home Telephone Commany, Joplin, Mo.; 300 additional for the Newark Telephone Company, Newark, Ohio; 300 additional for the Cedar Rapids & Marion Telephone Company, Cedar Rapids, Iowa; 150 additional for the Bloomington Telephone Company, Bloomington, Ind.; 150 additional for the Canton Home Telephone Company, Canton, Ill.; 150 additional for the Home Telephone Company, Elkhart, Ind., and 150 additional for the Stephenson County Telephone Company, Freeport, Ill.

JOHN A. ROEBLING'S SONS COMPANY, Trenton, N. J., has recently issued a booklet entitled "Some Roebling Products." In it the various uses for the products of the company are illustrated with attractive half tone engravings. These include cableways, rigging, elevator ropes, suspension bridge cables, long span transmission lines, cable supports, messenger wires, pole guys, telephone wire, both iron and copper, trolley wires and all kinds of insulated wire, besides wrenches and other tools. The company maintains branch houses and agencies in New York, San Francisco, Chicago, Cleveland, Atlanta, Los Angeles, Seattle and Portland, Ore. Inquiries should be addressed to the nearest agency.



D. & T. Anchor, expanded.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, Mo., is mailing the February issue of the Everbest Magazine. This magazine is published monthly and is devoted to things electrical. In the current number part one of the seventh lesson upon the physics of the incandescent lamp is given. In it the theory of light due to vibration of the ether is explained in a simple and interesting manner. Other articles of interest are "Commercial Co-operation" and "Mechanical Vibration." A copy of this issue will be sent to all parties interested free of charge.

THE WIRE AND TELEPHONE COMPANY OF AMERICA, Rome, N. Y., has recently issued bulletin No. 100, together with a binder in which successive numbers can be kept for convenience and reference. This company was organized for the purpose of manufacturing bars and insulated copper wire for electrical purposes, telephone apparatus and supplies, and also to act as consulting and contracting engineers for telephone systems. In the bulletin under consideration the business of the company is ably set forth, special attention being given to the details of organization and manufacture. Great care has been exercised in the publication of this preliminary number. The paper, type and general arrangement convey a dignified and business-like impression, which will be appreciated by all who may receive a copy. The company is at present in an exceilent position to furnish material upon short notice, and will be pleased to furnish quotations, together with the above-mentioned bulletin and binder to telephone companies interested.

THE MONARCH TELEPHONE MANUFACTURING COMPANY of Chicago reports that it is again in a position to make prompt shipments of telephones and switchboards. On January 1 of this year the Monarch Company increased the size of its factory, and changed the location of the different departments. The departments are now settled in their new quarters, and the output is rapidly increasing so that it will soon be almost twice as much as it was last year. The customers of the Monarch Company who have been delayed slightly during the past few weeks will now be able to secure their goods with the usual promptness.

THE PERU COMMON BATTERY LOCK OUT TELEPHONE MANUFACTURING COMPANY has been incorporated. The company proposes to manufacture and sell a patented device that locks party lines against all eavesdropping by patrons. Marke P. Boone, F. H. Griswold and Joseph Andres of Peru, Ind., are the incorporators.

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3 Metallic Circuits Out of 2 Circuits

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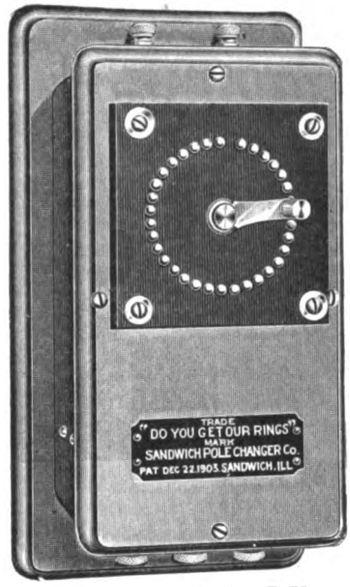

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A child can balance your lines instantly with this switch after your Duplexers are once installed.

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You need not buy before being convinced of their true value. We send our instruments on 30 DAYS' FREE TRIAL. So you may know how much TIME and money they will SAVE you. Write and let us know your needs. We can do you a great amount of good for a small outlay of money.

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FINANCIAL.

STAR, ILL.—The Star Telephone Company has increased its capital stock to $25,000.

MAJENICA, IND.—The Majenica Telephone Company has increased its capital stock from $10,000 to $25,000.

RICHMOND, MASS.—The Richmond Co-operative Telephone Company has increased its capital stock to $3,000.

BENZONIA, MICH.—The Benzie County Telephone Company has declared a dividend of 7 per cent.

CONSACKIE, N. Y.—The Coxsackie & Greenville Telephone Company has declared a dividend of 10 per cent.

WAYNE, N. Y.—The Wayne-Monroe Telephone Company has declared a dividend of 1½ per cent.

AUSTIN, TEXAS.—The North Texas Telephone Company, of Pecan Gap, Delta County, has filed an amendment to its charter increasing its capital stock from $2,000 to $10,000.

BONHAM, TEXAS.—The Texas Telephone Company, of Bonham, has increased its capital stock from $20,000 to $30,000.

FRANCHISES.

LAKE BUTLER, FLA.—S. H. Mallory, of Lake Butler, has been granted a twenty year franchise to operate a telephone exchange at Lake Butler, also in the surrounding country.

ADAIRVILLE, KY.—Dr. Smith, representing the Home Telephone Company, has secured a telephone franchise at Adairville.

RUSSELLVILLE, KY.—J. E. Zeluff has secured a telephone franchise at Russellville, Ky.

GREENFIELD, MASS.—The Heath Telephone Company, of Heath, has been granted a telephone franchise in Greenfield. The construction of the line will commence at an early date.

BUTTE, MONT.—F. H. Stow, of Portland, on behalf of the Home Telephone and Telegraph Company, has applied for a telephone franchise at Butte.

GREAT FALLS, MONT.—Frank H. Stow, of Portland, representing the Home Telephone and Telegraph Company, has applied for a franchise at Great Falls.

PLYMOUTH, N. H.—The Baker's River Telephone Company, of Warren, has applied for a telephone franchise in Plymouth.

SPOKANE, WASH.—Application has been made by the Spokane Bridge and Liberty Lake Rural Telephone Company for a franchise.

SPOKANE, WASH.—The Valley Prairie Telephone Association has plied for a telephone franchise at Spokane.

MILTON, W. VA.—The Milton Telephone Company, of which J. H. Harshbarger is president, has applied for permission to construct and operate a telephone system in Milton.

MEXICO CITY, MEXICO.—G. K. English and R. H. Dickey, of St. Joseph, Mo., are applying for a franchise to build and operate a long distance telephone system in Mexico. These gentlemen represent a syndicate of American capitalists.

COMBINATIONS.

ATLANTA, GA.—The Fairview Telephone Company, owning and operating telephone lines in Hamilton and Tipton counties, has purchased the rights and property of the Atlanta Telephone Company in those places.

VIOLA, WIS.—The Union Telephone Exchange at Viola has been sold to the La Crosse Interurban Telephone Company. The La Crosse Company is to rebuild the exchange and put in a complete new system.

ELECTIONS.

IROQUOIS, ILL.—The Iroquois Telephone Company has elected the following officers: Charles A. Calkins, president; Curtis Miller, secretary; Sol. Meyer, treasurer.

HOME CITY, KAN.—The Home City Mutual Telephone Company has elected the following directors: C. A. Batterson, E. H. Tangeman, E. W. Zimmerling, C. Noller, W. B. McGrath, James Cooper and John Hartman.

LOUISVILLE, KY.—At the annual meeting of the Independent Long Distance Telephone and Telegraph Company held in Wilmington, Del., in February, the following directors were elected: John A. Armstrong, J. D. Powers, Chas. J. Doherty, Donald McDonald, S. S. Adams, Jr., C. C. Bickel, J. W. Irwin, E. M. Coleman, C. L. Hughes, George W. Lewman, C. D. Knoefel, Matt O'Doherty, Ed. L. Barber.

LOUISVILLE, KY.—At the annual meeting of the stockholders of the Louisville Home Telephone Company held at Wilmington, Del., in February, the following directors were elected: John A. Armstrong, Charles J. Doherty, E. M. Coleman, C. C. Bickel, J. D. Powers, George W. Lewman, C. L. Hughes, W. C. Garland, J. G. Gray, C. D. Knoefel, Donald McDonald, Matt O'Doherty, Ed. L. Barber.

PENN YAN, N. Y.—The Keuka Park Telephone Company has elected the following officers: President, James H. Pepper; vice-president, E. B. Knight; secretary and treasurer, Fred Culver.

ARCADIA, O.—The Arcadia Mutual Telephone Company has elected the following officers: President, G. W. Dick; vice-president, M. O. Heistand; secretary, A. L. Anderson; treasurer, E. B. Bish.

FREMONT, O.—The stockholders of the Home Telephone Company, at their meeting at Fremont, elected the following directors: T. M. Brush and A. E. Lord, of Elyria; A. W. Overmyer, of Lindsey, and S. Brinkerhoff, J. M. Sherman, E. M. Russell and James Hunt, of Fremont.

CONESTOGA, PA.—The Conestoga Telephone and Telegraph Company has elected the following officers: Henry Hertzler, president; Jacob Heartz, superintendent and manager; Stephen Mast, treasurer.

MONROE, PA.—The Monroe Telephone Company is to be reorganized. The following officers were elected: J. S. Schoonover, president; W. A. Erdman, secretary-treasurer, and B. L. Hursh, manager.

OAKFIELD, WIS.—The Oakfield Telephone Company has elected the following officers: President, A. J. Zielke; vice-president, George Day; secretary, W. E. Bristol; treasurer, C. H. Moore; superintendent, T. E. Worthing.

BURGESSVILLE, ONT., CAN.—The Burgessville Telephone Company has elected the following officers: President, H. E. Scruis, Burgessville; vice-president, J. G. Carless, Burgessville; secretary treasurer, H. Sneath, Woodstock; managing director, Martin Emigh, Holbrook.

NEW COMPANIES.

VALMEYER, ILL.—An Independent telephone company has been formed at Valmeyer with the following officers: Henry Volhardt, president; E. J. Lee, Jr., secretary. The lines of the company will connect with the Farmers' Fountain Telephone Company of New Hanover.

WHITE WALNUT, ILL.—The White Walnut Telephone Company has been organized. The officers are: E. F. Logan, president; Chris. Schmalriede, secretary; Herman Pulke, treasurer.

FISHER'S SWITCH, IND.—The Highland Telephone Company, Fisher's Switch, Ind., has been incorporated with a capital stock of $2,000. Directors: Claude Beaver, W. Beaver, C. Sachs, Thomas McCarthy.

HIGHLAND, IND.—The Highland Telephone Company, of Highland, Ind., has been incorporated with a capital stock of $20,000. The incorporators are Albert Craig, Claude Beaver and A. H. Shaffer.

SHIPSHEWANA, IND.—The Shipshewana Telephone Company has been incorporated to build an exchange and telephone system in Shipshewana and Legrange County.

FORT ATKINSON, IA.—The Farmers' Mutual Telephone Company, Fort Atkinson, Ia., has been incorporated with a capital stock of $2,500. President, C. D. Horton; vice-president, L. T. Huber; secretary and treasurer, J. A. Huber.

HONEY CREEK, IA.—The Honey Creek & Southwest Telephone Company has been formed. G. W. Cronbaugh, president; Wm. Schraeder, secretary. The company will build lines from Koszta to the adjoining country.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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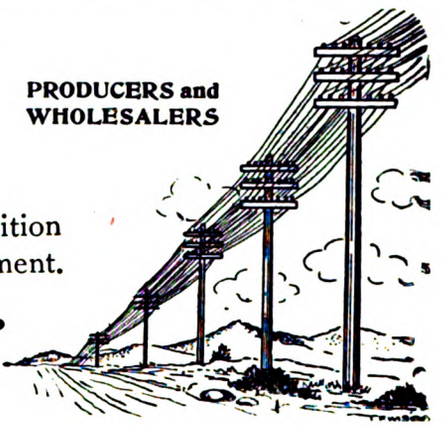

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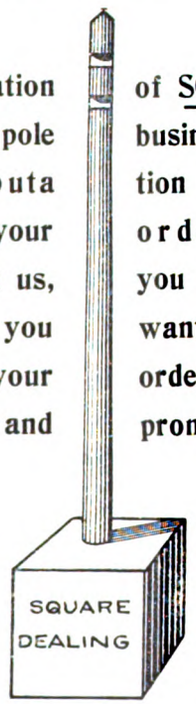

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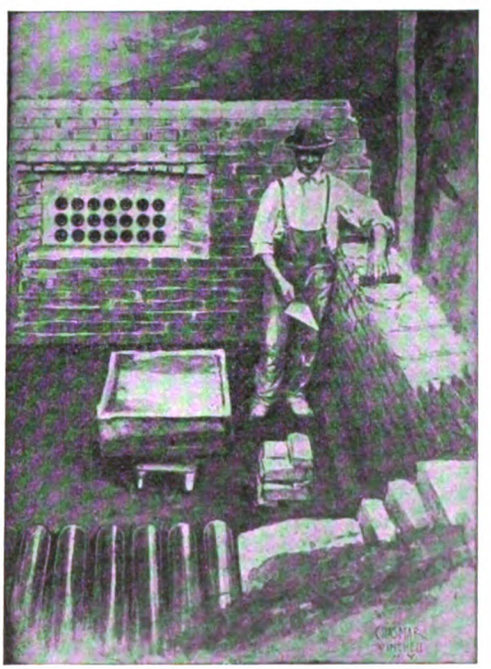

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THE WEEK'S MESSAGES

MEDIAPOLIS, IA.—The Square Deal Mutual Telephone Company has been organized with the following officers: President, J. B. McCray; vice-president, Robert Eland; secretary, J. L. Siscoe; treasurer, Lewis Wogner.

WATERLOO, IA.—The Wenkel Telephone Company has been organized with the following officers: Jasper Kruse, president; William Wenkel, vice-president.

WILLIAMS, IA.—The New Mutual Telephone Company, of Williams, has been organized with the following officers: President, E. I. Johnson; vice-president, J. L. Wilde; secretary, Ray Johnson; treasurer, William Gerber; manager, A. T. Ross.

BENTON, KAN.—The Benton Telephone Company has been incorporated with a capital stock of $1,000.

HOXIE, KAN.—The Hoxie-Northwestern Telephone Company has been incorporated with a capital stock of $1,200.

BLANDFORD, MASS.—The Blandford & Chester Mutual Telephone Company has been organized. The incorporators are A. L. Lewis and others.

LAKE CITY, MICH.—The Missaukee Telephone Company, Lake City, has been incorporated with a capital stock of $20,000.

LAKE BENTON, MINN.—The Lincoln County Telephone Company, with its home office at Lake Benton, has been incorporated with a capital stock of $50,000. The incorporators are K. G. Skartum, John H. Hanson, Charles E. Lavesson, Hans Lavesson, F. E. Tucker and John McKenzie, all of Lake Benton.

TAOS, N. M.—The Taos Valley Telephone Company, with headquarters at Taos, has been incorporated with a capital stock of $5,000. The incorporators and directors are: Peter M. Dolon, Jose Mountaner, John A. Dorney, Juan A. Vigil and others.

EVANS MILLS, N. Y.—The North County Telephone & Telegraph Company has ben incorporated with a capital stock of $15,000. The directors are: F. E. Rosbrook, M. J. Matty, C. E. Pail, Stephen Gould, F. G. Rosbrook and E. E. Ward, of Evans Mills, and A. I. Rosbrook, of Carthage.

HUNTS CORNERS, N. Y.—The Lapeer Telephone Company has been organized with the following officers: President, Lester Parker; vice-president, Wallace B. Lusk; secretary, E. E. Hulse; treasurer, W. B. Perse.

NORWAY, N. Y.—The Crockett Ridge and Millettville Telephone Company has been incorporated with a capital stock of $5,000. President, E. B. Tubbs; treasurer, H. G. Dinsmore; clerk, A. T. Crooker, all of Norway.

BRYSON CITY, N. C.—The Bryson City Telephone Company has been incorporated with a capital stock of $5,000. Incorporators: R. L. Sandridge and others.

HAMPLE, N. D.—The Hample-Crete Telephone Company, Hample, has been incorporated with a capital stock of $50,000. Incorporators: C. E. Knox, B. W. Slocum and H. P. Boardman.

PERSONAL.

FRANK H. BETHEL, who has been associated with the Chesapeake and Potomac Telephone Company as its general manager since May 1, 1904, has been appointed vice-president of that company as well as vice-president of the Bell Telephone Company of Philadelphia and the Delaware and Atlantic Telephone Company.

ASHLEY E. BRADFORD has been promoted to the position of district chief by the Wisconsin Telephone Company, and will superintend the construction work in several counties, with headquarters at Eau Claire.

A. T. CLARK, of Wayne, has been appointed assistant to the special agent of the Nebraska Telephone Company, with headquarters in Omaha.

D. I. DIXON has been appointed manager at Menominee by the Wisconsin Telephone Company.

VANCE LANE, formerly general manager, has been elected vice-president of the Nebraska Telephone Company.

A. C. SCHROEDER, who for the past three years has been in charge of District No. 3 of the Chicago Telephone Company, with headquarters in Barrington, has been promoted to the Chicago department.

E. H. SIDWELL has been appointed manager of the Johnson County Telephone Company at Iowa City, Ia.

MISCELLANEOUS.

IOWA CITY, IA.—A. T. Averil and G. M. Averil, of Cedar Rapids, have purchased $23,000 of the $46,000 of stock of the Johnson County Telephone Company.

MAYSVILLE, KY.—After an unsuccessful attempt to involve the Maysville Telephone Company in a sub-license contract the Bell company endeavored to obtain a franchise. Admittance to the town was denied by a vote of 10 to 1.

TOLEDO, O.—The Toledo Home Telephone Company installed 370 new telephones during the month of February. The company is very busily engaged installing new private branch exchanges. Eight contracts for installations in prominent establishments have recently been closed.

New Construction in the Field

TUCSON, ARIZONA.—The Consolidated Telephone Company is soon to build a line to San Diego, Cal.

COALINGA, CAL.—The Coalinga Telephone Company, of Coalinga, is to build a line to Fresno Hot Springs.

CORONA, CAL.—The Corona Home Telephone and Telegraph Company is to install a new system.

HEMET, CAL.—The Southwestern Home Telephone Company, of Redlands, is to establish an exchange at Hemet.

OWINGSVILLE, KY.—The Bath Home Telephone Company is building a line from Owingsville to Flat Creek.

REDDICK, ILL.—The Reddick Mutual Telephone Company is putting in a trunk line to Gardner via Wilson. They will also build a line to Cabery and Buckingham.

SPRING GROVE, ILL.—The Spring Grove Telephone Company has planned many extensions to its system. This company was recently incorporated with a capital stock of $10,000.

BEDFORD, IA.—The Bedford Telephone Company is to make many improvements in its system.

SALINA, KAN.—The Salina Telephone Company is to build a line from Sylvan Grove to Salina.

BLANCHARD, MICH.—A telephone exchange is to be installed in Blanchard in the near future. It will be connected with the Citizens' Telephone Company and the Blanchard Telephone Company's rural telephone line.

GRAYLING, MICH.—John Love is promoting the project of building a telephone line from Roscommon to Grayling.

KALKASKA, MICH.—The Kalkaska Telephone Company is building a line from Lodi to Kalkaska.

FULTON, MO.—The Buffum Telephone Company is to spend $15,000 in improving its service in Fulton. It will put in a new switchboard and new cables all over the city.

GENEVA, NEB.—The Fillmore County Telephone Company contemplates many improvements to its system.

STANTON, NEB.—The Stanton Telephone Company is extending its lines south of the town of Stanton.

ELMDALE, N. Y.—The Farmers Telephone Company, with an exchange at Gouverneur, is building lines to Elmdale. It will also build lines to Pierce's Corners.

PULASKI, N. Y.—The Black River Telephone Company is to build a number of farmers' lines this spring.

WADESBORO, N. C.—The Wadesboro Telephone Company, in addition to installing new central office equipment, will make many other improvements in its system.

NEWARK, O.—The Newark Telephone Company is to build a number of country lines.

NEWTON FALLS, O.—The Newton Falls Telephone Company contemplates further extensions to its system.

PORTLAND, ORE.—The North Western Long Distance Telephone and Telegraph Company will soon commence work on its toll lines.

PROVO, UTAH.—The Utah Independent Telephone Company is building a line between Provo and Springville.

TACOMA, WASH.—Work has been started on the plant of the Home Telephone Company, under the direction of Mr. Zahm. Mr. Zahm has charge also of the construction work at Bellingham.

GREEN BAY, WIS.—The Fox River Valley Telephone Company is to build seventy-five miles of additional toll line in the vicinity of Green Bay, to enable it to better compete with the Bell service. Frank Carswell is now general manager of the Valley system.

FORT WILLIAM, ONT., CAN.—The rate payers have passed a by-law to provide $12,000 for improvements to the municipal telephone system. Address Mayor Whalen.

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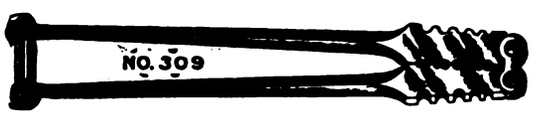

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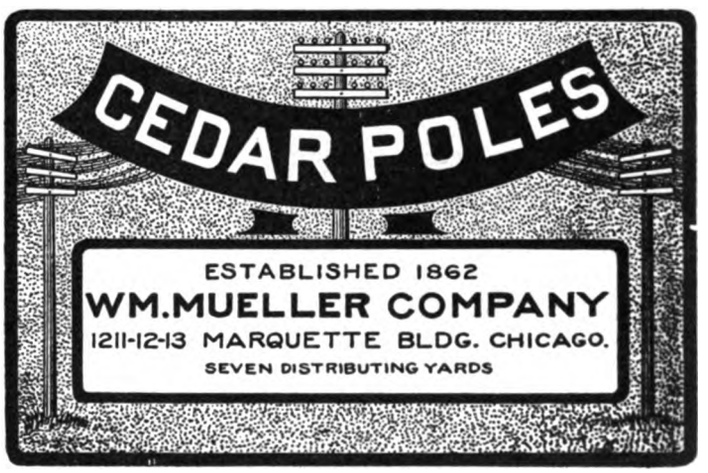

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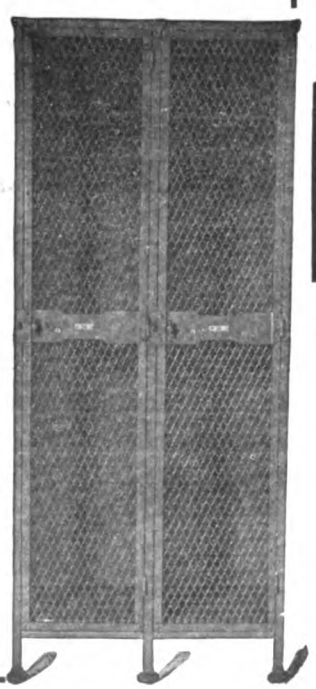

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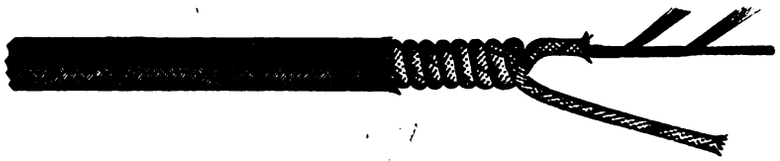

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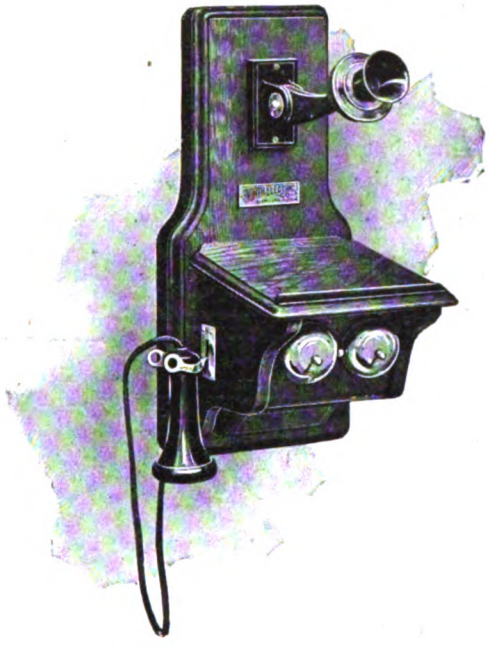

The hinged front of "NORTH'S" common battery wall type telephone renders the condenser and instrument wiring accessible without removing from the wall.

The cabinets are not veneered, but every stick of lumber is from a veneered mill; for they handle nothing but the most beautifully figured woods. The stock is 18 months old, kiln dried 30 days and given a hand-rubbed finish involving 7 processes.

They are equipped with the following standard parts, and will operate on any standard common battery system.

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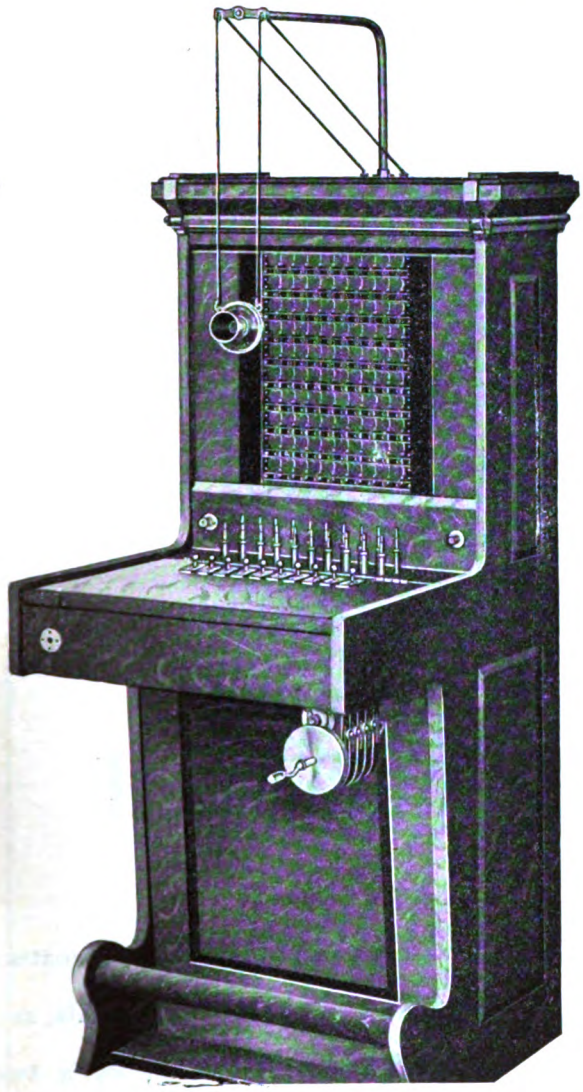

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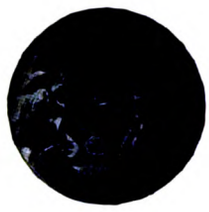
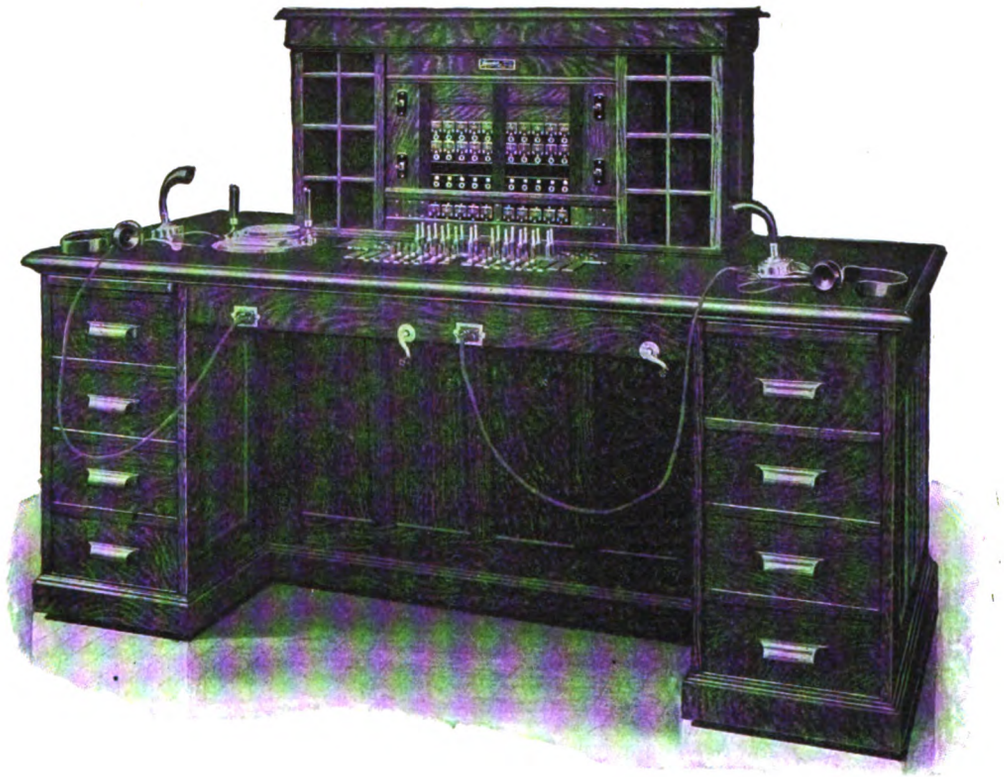


TOLL BOARDS



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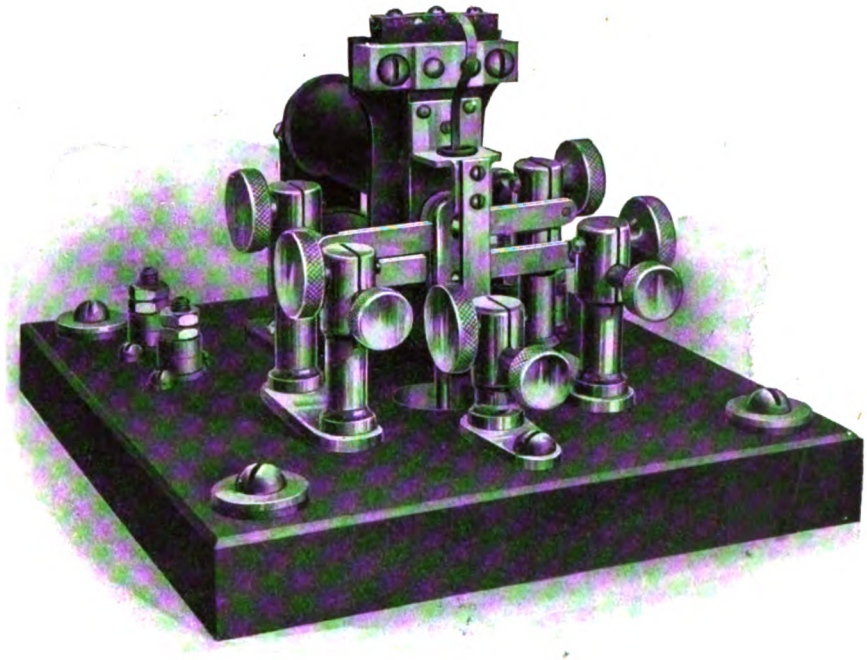

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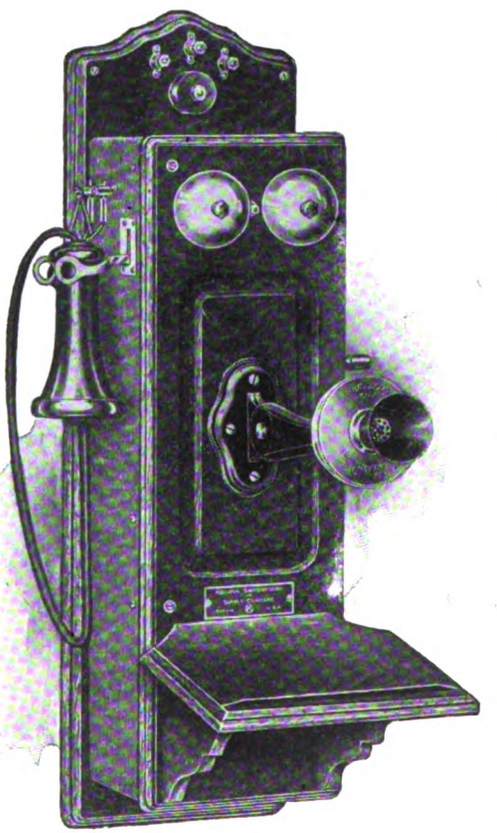

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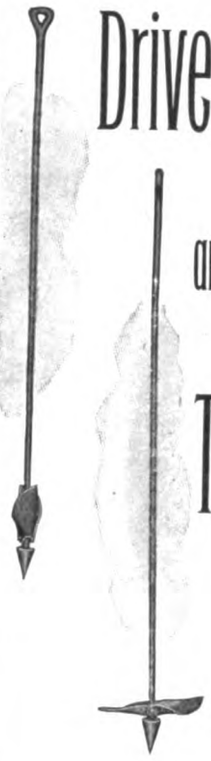

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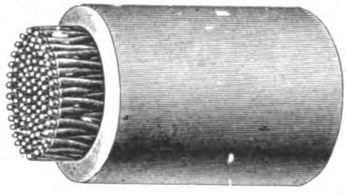

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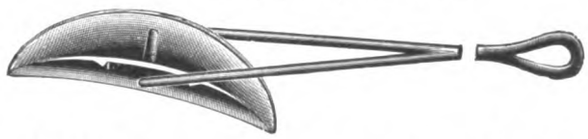

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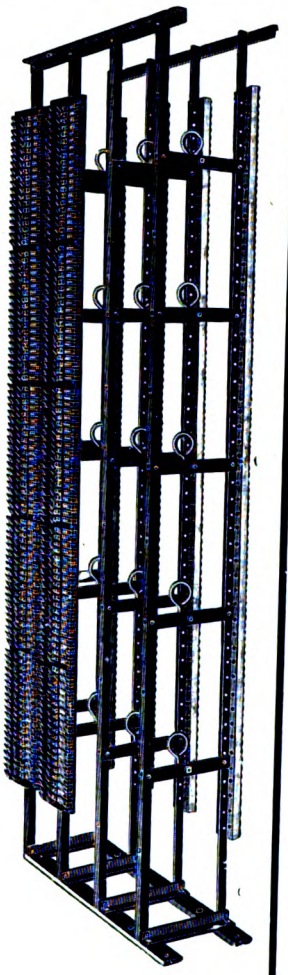

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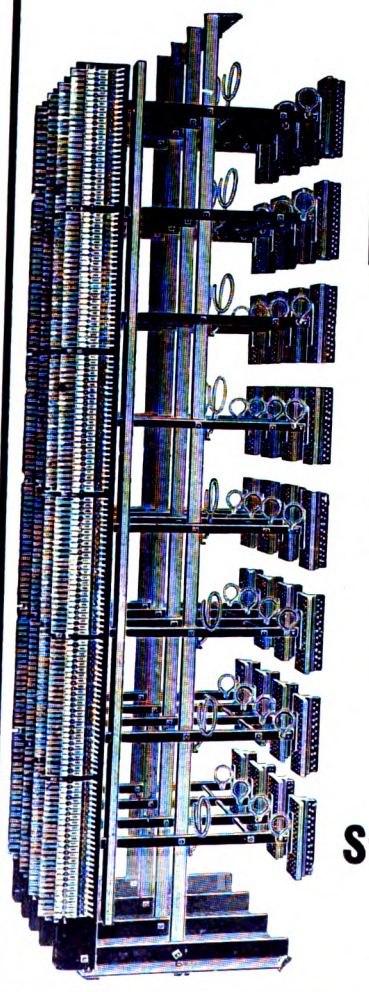

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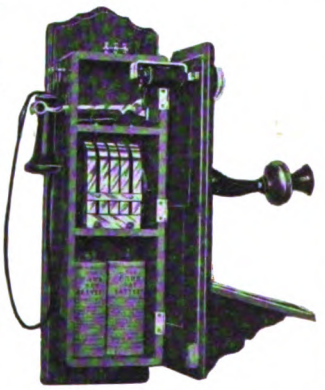

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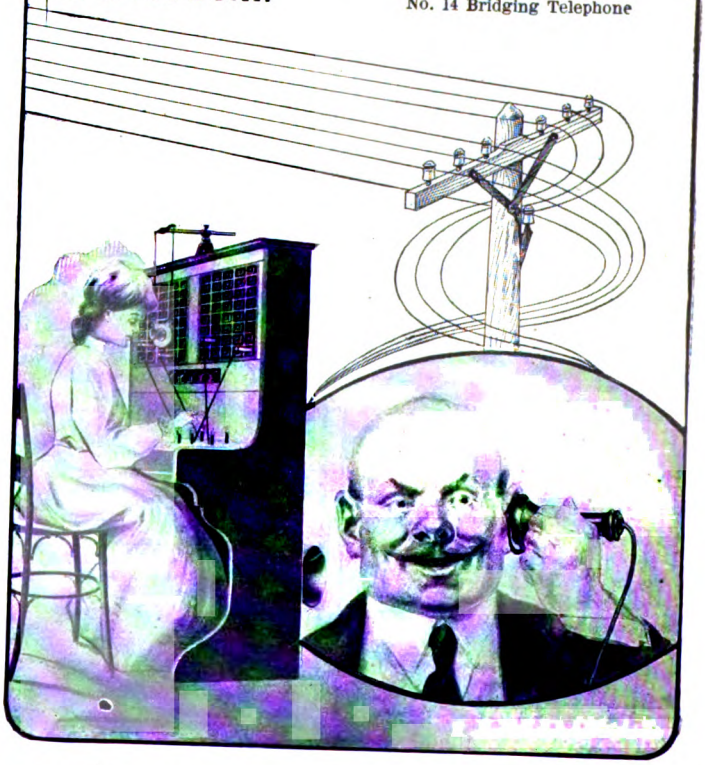

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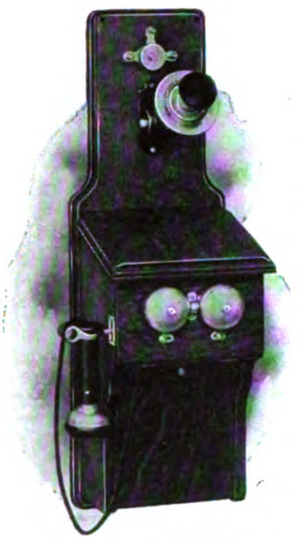

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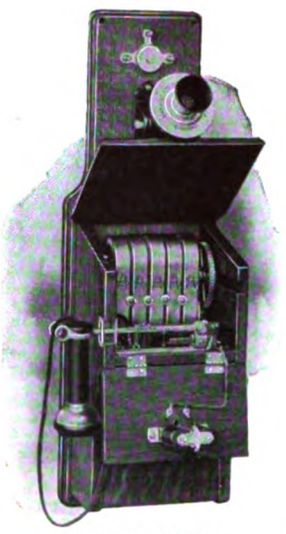

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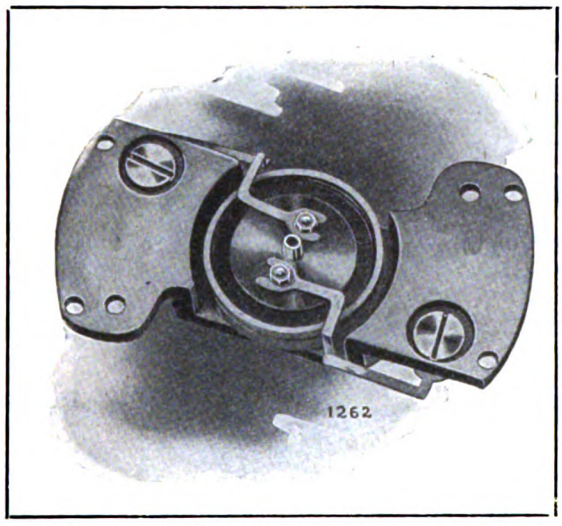

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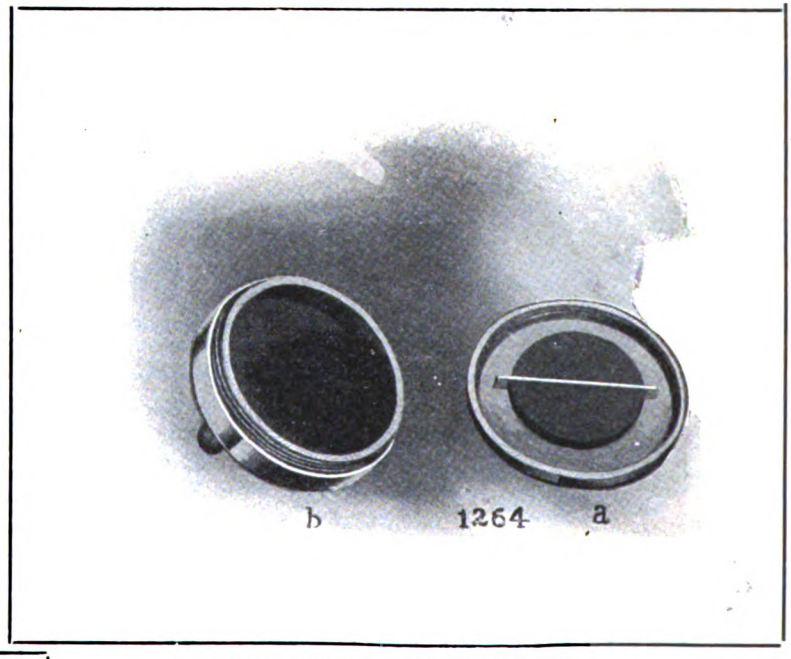
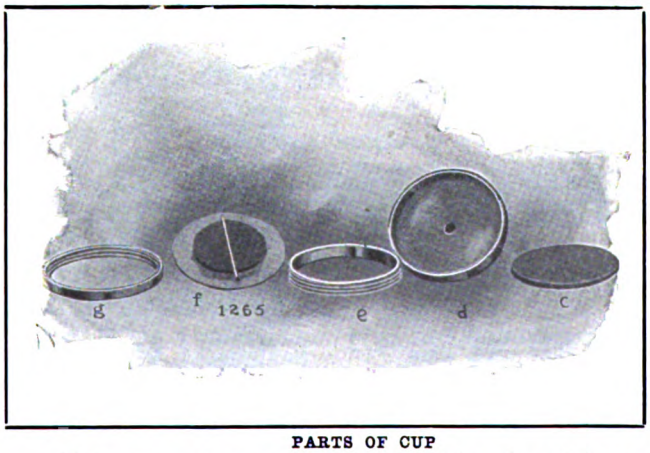


CARBON CUP WITH CARBON REMOVED



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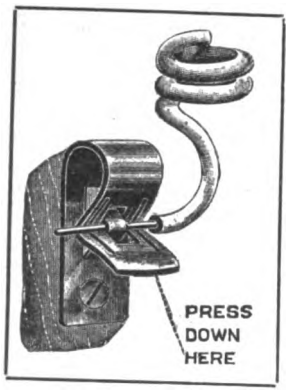

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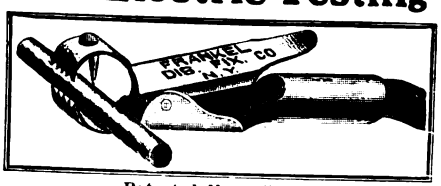

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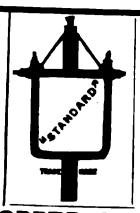

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Some Telephone High-Tension Crossings

By John Putnam.

Illustrations from Original Sketches by B. S. Stevens and Photographs by the Author.

IN the preceding number of this article we endeavored to show the dangers to which are exposed telephone lines located in too close proximity to high tension circuits, especially those carrying current at a voltage of 6,600 or more. The desirability of protection was brought out, both from a monetary and service standpoint, and attention was called to some methods of protection when high tension and telephone circuits cross each other. The reader was shown the short span crossing, which looks good and seems desirable from every point of view, and also the style of crossing in which one line is protected from the other by a screen to prevent contact between the two classes of circuits.

In Fig. 4 we have a view of a double, three phase high-tension line, crossing forty telephone wires. It is easily seen that at this point the short span crossing is not feasible. The railroad track is in the way of setting poles for such a crossing, and the high tension line meets the telephone line on a sharp uphill turn. Although the diagonal approach of the three phase line is a bad feature, no difficulty has as yet been experienced from its proximity. These telephone lines are so important that any difficulty would cause a serious damage to the service as the wires on the top arm are the New York-North Adams, Mass., long distance lines, which are heavily loaded during a great part of the time. This crossing embodies all the various ideas shown in Fig. 3. If the reader will look closely at Fig. 4 he will notice the guard wire of heavy wire rope strung from the top of one telephone pole to the other. This guard rope is carefully grounded at the foot of each pole, preferably by being buried in a deep hole, which is partly filled with coke or charcoal. Beneath the guard wire is the insulated screen, using a twelve pin arm on each pole with twelve No. 6 iron wires strung between them. This arm is noticeable in the illustration, as it projects beyond the ten pin arms which carry the working wires.

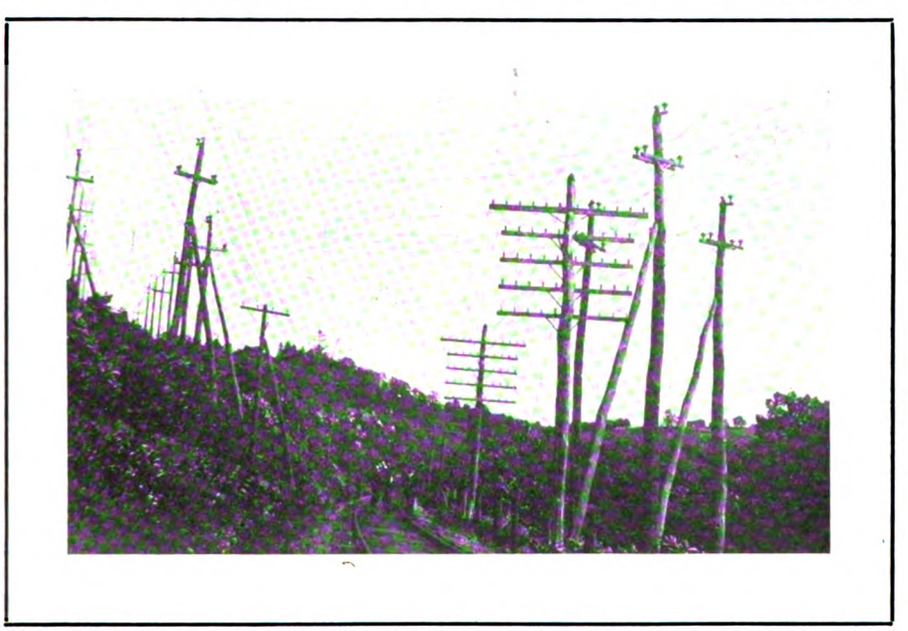

Fig. 4. The 33,000-volt high tension line approaches a 40-wire telephone line on a sharp grade, and crosses diagonally, above the telephone wires.

A more recent design for such a screen proposes making it of seven strand messenger wire and grounding the whole screen. This would seem to be theoretically better. Still another design proposed for cases where the telephone line crosses above the high tension conductors is to screen the latter wires above and below in order that in case of a break the telephone wire would not come against the three phase line by whipping around under it.

Imagine, now, that we climb the railroad embankment at the left in Fig. 4. After some little exertion we will be pretty nearly on a level with both lines, and upon turning about the crossing will look as it does in Fig. 5. The screen can be seen particularly well, as can the three wires of the three phase line. In the background will be noticed the highway, the Housatonic River, and the thickly wooded hills beyond it, all giving one a particularly good bit of local color. The telegraph line at the left in Fig. 4 has no protection, but perhaps the telegraph company can afford to take a chance. From its appearance it is a safe prediction that it will fall down before the three phase line does.

Lines carrying alternating currents at high voltages are subject to a peculiar trouble known to the people handling them as a line surge. Alternating currents being subject to the sine law, are commonly explained by the familiar sine curve. Draw a horizontal line with a high continuous curve half above and half below it. This represents one complete cycle of a single phase alternating current. Now, on the same line, draw a similar curve one-third behind that. You have now a pretty fair representation of a three-phase current. Fancy these curves all in a wave motion following one another rythmically and harmoniously. Now suddenly stop the advance wave and what happens? Your succeeding waves pile up on it and its height increases greatly. Some such action sometimes takes place in the high tension circuits. It may be due to a sudden decrease or increase in demand for current at the end of the circuit, or to some other cause such as throwing in or out a large amount of impedance, thereby causing a distortion of the phase. This increase in current causes the circuit breakers to operate at a time when the current flowing is at a maximum. When the circuit is thus suddenly interrupted, the current no longer follows the sine law, but drops instantly to zero. This causes the electro motive force of self induction in the circuit to suddenly rise to many thousands of volts above the active electro-motive force of the line. This high voltage tends to short circuit on itself and does it through the arresters on the high tension circuit. These arresters are simply a zig-zag arrangement of a

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number of knobs of insulating material having a metallic covering, all slightly separated from one another so as to form a series of spark gaps from line to ground. Thus for an infinitesimal instant one side of the power line is effectually grounded, thereby raising the potential of the opposite side to many thousand volts above that of the earth. This causes the static field of force which, under normal conditions, is more or less closely confined to the power wires themselves, to become suddenly extended over a wide area, which tends to set up induced currents in telephone or other lines which happen to be in the immediate vicinity. When the discharge to earth from the power line takes place, it is usually oscillatory in character and induced currents of high voltage are set up in the adjacent telephone circuit. These currents are earth seeking, and can only escape by breaking down the insulation of the telephone line at some point. This they do by jumping across the arrester gaps or from cable conductor to cable conductor, thereby burning off the conductor.

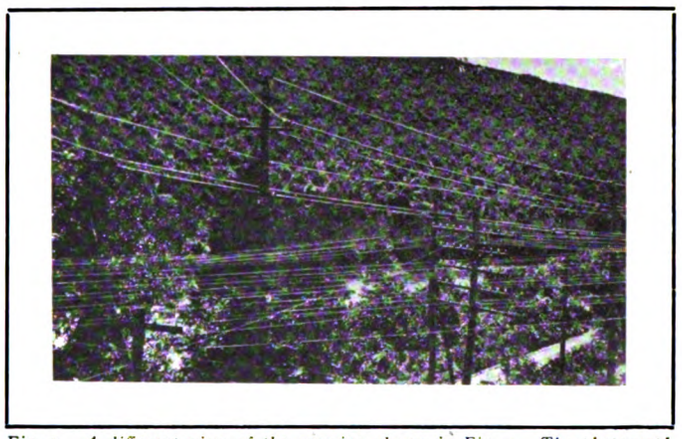

Fig. 5. A different view of the crossing shown in Fig. 4. The photograph was taken from a point on the hillside, above the wires.

Such a trouble took place very recently at the telephone exchange in New Milford. There was the familiar static discharge into one of the lines and a number of the drops on the magneto switchboard fell all at once. Upon investigation the line to the power station was found open and one other line grounded. A pair of cable conductors forming a portion of the power company's line was afterward found to be burned out. It is interesting to telephone men to know what was found on these two lines. At the subscribers' station one line was equipped with carbon cutouts only. These showed the usual signs of the passage to ground of a high voltage current. After cleaning them the line was found to be clear. The other line was equipped with protectors consisting of a carbon cutout, a seven ampere fuse, and a sneak current device in juxtaposition with the fuse. These showed the same conditions as the protection on the first mentioned line. In no case had the fuses or sneak current device operated. Nor was the metallic globule in the carbons melted. In fact, both lines showed the same effects as though a lightning discharge had taken place.

It is evident from these results that while the voltage of the induced current in the telephone line was very high, the amount of current was exceedingly small. The damage to the cable conductors was not due to a heavy influx of current, but to the heat occasioned by the arc when the current jumped from one cable conductor to another. It has now been recommended that the telephone line be moved at those points where it is so close to the power line. The question immediately arises as to what distance this separation ought to be. The common sense answer is that it should be more than the sum of the heights of both lines. That is, if both lines were thirty feet high, they should be over sixty feet apart.

The sketch Fig. 6 shows an underground crossing. This is rather an expensive type, but ought, if properly built, to give good protection. Our first thought regarding this crossing would probably be that here we have a well nigh perfect screen, consisting of the earth itself, but experience has shown that with a high tension current flowing into the earth certain methods of construction are not of the best.

As originally built this crossing was made with an iron pipe 1½ or 3 inches in diameter, according to the wire capacity desired, laid below frost line, from pole to pole. At each pole, which is properly guyed, is the usual pipe bend, and at the end of the pipe where it runs up the pole, is a goose neck to keep out the rain. A hole drilled at the lowest point of the duct over a pocket filled with crushed stone will serve to drain the conduit of moisture due to condensation. The telephone company has used No. 14 twisted pair "distributing wire" drawn into this conduit, and has had comparatively little trouble with it. This wire is sleeved direct to the line without fuse or spark gap protection. Some of these crossings are remote from a repair man, and it is deemed more advisable to risk losing a pair of wires worth $1.47 a hundred feet than to hire a team at an expense of $2 or $3 after every lightning storm. The illustration, Fig. 7, shows one of these crossings where a six circuit telephone line crosses the high tension. The contour of the ground is such that only one telephone pole could be shown in the picture. This crossing has been in use two years, and only once has there been any trouble with it, when two pairs of wires were opened by lightning, although lightning storms are frequent in this part of the country. Even this tendency to trouble might, to an extent, be eliminated by substituting insulating fibre conduit for the iron pipe. The need of such substitution is well shown by a recent case of underground crossing trouble. In this case, the iron pipe was not buried deeply enough, being only about eighteen inches underground. The crossing is 140 feet wide of inch and a half pipe. Two circuits of No. 19 gauge single pair lead covered cable with a circular loom weaving over the lead, were drawn into

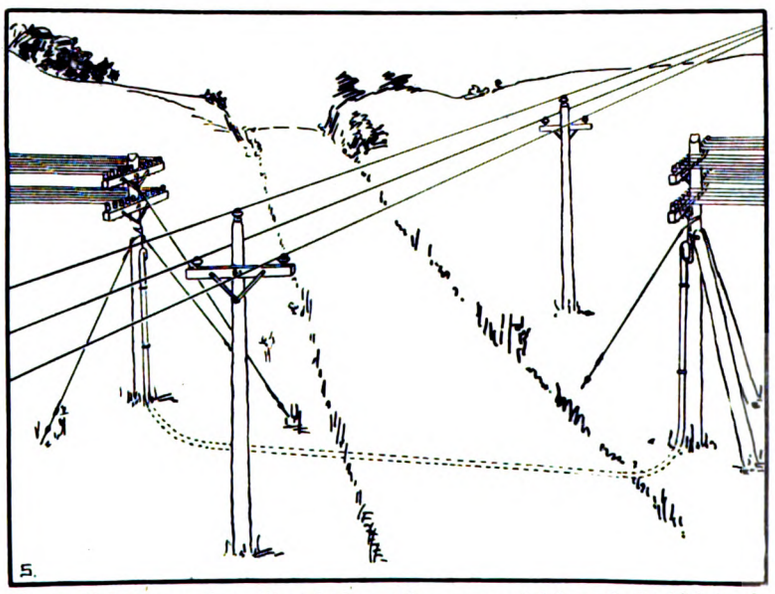

Fig. 6. Toll line crossing. The telephone wires are carried beneath the high tension wires in an underground conduit.

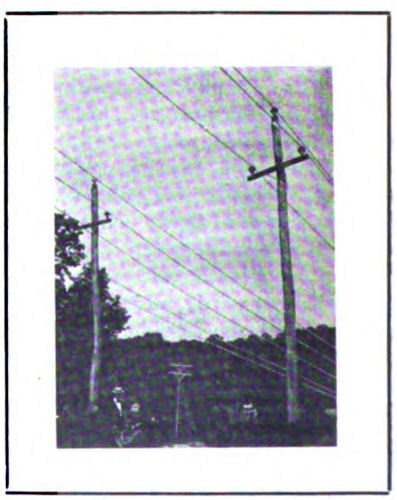

Fig. 7. The underground crossing provides for absolute separation.

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it. The 33,000 volt line broke and fell on the ground about midway of the crossing. Both telephone circuits were burned off at each end of the pipe. Upon examination the earth and stones were found fused together between the pipe and the high tension line, and the pipe showed signs of having been heated to a high temperature. Evidently the current had traversed the pipe to each end and from there arced to the single pair cables and burned them off. The substations were unharmed, being protected by carbon cutouts. Here were three faults in the crossing construction; a metallic pipe, that pipe not deep enough, and the wrong kind of wire used, the latter being too small in gauge and having a metallic covering. The chance of the high tension circuit falling on the ground at the point of crossing is, of course, a very remote one, but it did actually happen, and these crossings must be planned on the supposition that such an accident is to take place, and not on the theory that if they are not right nothing will happen anyhow. The proper form for an underground crossing is rather problematical, but reasoning from theory and what experience has shown, it is evident that the conduit should be insulating, that it should be buried at least three feet, and the wires should be twisted pair, insulated, but not having a metallic cover and not smaller than No. 14 gauge. The depth for the conduit given above is based upon no especial theory except that in many places it would be below frost line, and that such a depth for excavation could be used without unusual expense.

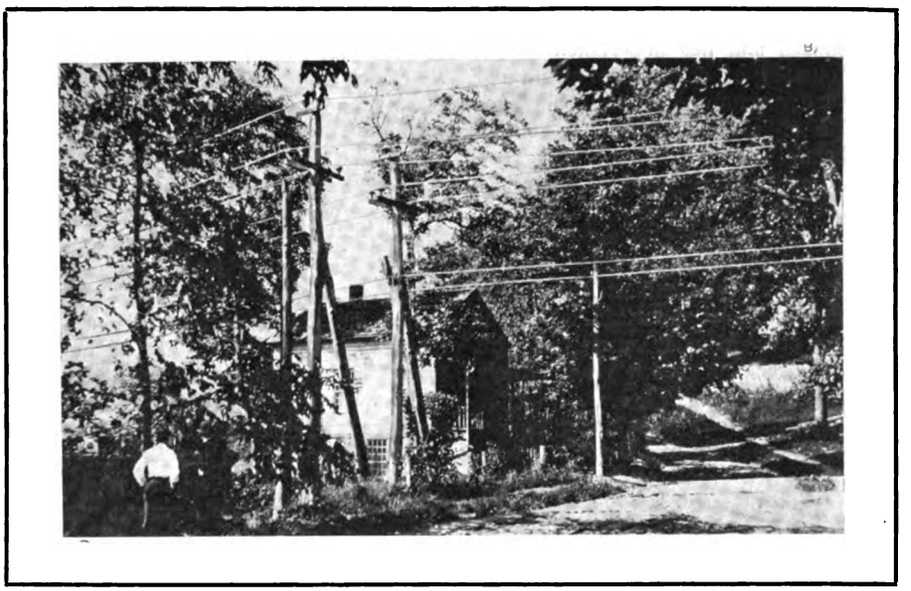

Fig. 8. The subscribers' service wires, supported on brackets on the shorter poles, pass the high tension wires underground.

Fig. 8 shows a single metallic circuit subscriber's service wire crossing the high tension line underground. The telephone poles are twenty feet high with two iron wires on a pair of brackets. The conduit is inch and a half pipe and through it is drawn a twisted pair of No. 14 distributing wire. There are a number of such small crossings in Connecticut, and they have given little if any trouble. This may be because the high tension line has not fallen on the ground over them except in one instance, as described in the preceding article. Although such a crossing for a single pair of wires might be considered expensive its use is justified not only by the protection afforded the subscriber, but by that given other circuits in the cable from which these wires are taken.

(To be continued.)

Telephone Engineering*

By J. J. Carty.

UNLESS there is made a fairly correct forecast of the probable growth of subscribers' lines for a period of 15 or 20 years, it is clear that substantial errors will be made; but more than this, it is necessary not only to forecast the total number of lines expected, but their location must be determined within close limits. Not only must the location of the lines be decided upon, but the number of calls per day which may be expected over each line must be estimated; not only must the number of calls which are expected be correctly determined, but the time of the day during which these calls may be expected must be arrived at in some manner. Even more than this must be done, because it is necessary not only to know all of these facts, but also it must be known where the calls are to go. We must also know what proportion of these are likely to be toll calls, what proportion long-distance calls, and various other factors of like nature must be determined.

But conceding all this, what is the alternative method which we can follow? If we are to abandon the method of study herein described, what shall be substituted for it? By what plan shall we proceed which will enable us to arrive at a more economically constructed system? What method shall we adopt which will enable us to proceed without answering such questions as those which the present method of study undertakes to answer? It is obvious that what are erroneously called "common-sense" methods might be employed. Buildings might be erected in various locations in a city, chosen after an inspection of the region; they might be substantially constructed and provided with switchboards. These buildings might be joined together by subways, and in the subways cables could be located. Suburban and long-distance trunk-line subways might also be constructed, and there is no doubt that according to such a plan telephone business could be carried on. But have we, after all, in following this method avoided answering any or all of the questions with with which the study undertakes to deal? Most certainly we have not, and while it might not be appreciated, every step taken in this so-called common-sense method really makes a direct, though unconscious and unintelligent, answer to all of the questions propounded and dealt with in the formal study. If, following this common-sense method, it is decided to erect at a given location a central-office building with a switchboard of a given size, this office must be intended to serve a district of some definite form. If, as would of course be the case, other central-office buildings are erected at other locations, they too must be constructed with reference to fixed districts and their number must be determined with reference to the expected growth in subscribers; so that after all the magnitude of the expected growth is a factor which is unconsciously dealt with. But in determining upon the size of the switchboard and its construction, whether we realize it or not, a definite, though unwitting, answer is made to the questions of what shall be the rate of calling, what shall be the destination of the calls, what shall be their character, and at what time they shall occur. The switchboard and building must be planned for some set of conditions which can be established only by data of this character. Merely ignoring these questions and erecting the switchboard and arranging central offices without making a study does not avoid answering the questions, for by the construction carried out a direct and unequivocal answer to all of these questions is made, yet without giving consideration to any of them or even recognizing their existence.

*Continued abstract from paper read before the American Institute of Electrical Engineers, Feb. 23, 1906.

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It is easy enough, after central offices have been located, to plan for a subway joining those offices, but somebody must answer the question of how many ducts shall be provided in this subway. It may be done, on the one hand, by engineers after careful study with all of the facts before them, and after having analyzed the statistics of the past and having exhausted all possible methods of throwing light upon the subject; or it may be done by a man in the street with a pickaxe. Those who would follow the pickaxe method would not avoid questions which the engineer has recognized and has undertaken to answer. They would, by the number of ducts they would put down and by the character and magnitude of the other construction, give their answer to all of these questions without having considered any of them. As to which of these two methods should be followed, the telephone company must decide.

Ordinarily, engineering has to do principally, if not exclusively, with physical factors, but telephone engineering has not only to deal with physical factors of the utmost complexity, but it has also to deal with commercial questions which, of themselves, would seem to be only remotely connected with the work of the telephone engineer, but which really vitally affect it.

A telephone toll line and switchboard system might be designed in accordance with the highest state of the art and constructed so as to give the best efficiency and yet by the action of the business management, causing the adoption of what might seem to be a reasonable commercial practice, the operativeness of the switchboard system might be totally destroyed. This idea will be readily comprehended when we consider what would happen to the present toll board at Cortlandt street, operating on the recording basis, using the two-number method of calling, if, by some change in business plans, the particular-party method in use extensively in many other localities were adopted. Only a brief consideration of this case is required to show that, in addition to the present recording operator, a second set of operators would have to be employed, who would be required to call up the subscriber desiring the toll connection and obtain from him the details of his call. The adoption of such a method, while in itself a wasteful and inefficient one, would in the case I have chosen require the radical reconstruction of our entire toll-board plant. More than this, the adoption of such a method would render it impracticable to follow the direct-line trunking method which is now possible by the use of the two-number plan of calling. The abandonment of this method would require that such toll lines be handled from toll boards. The magnitude of the revolution which this would make in the engineer's plans will be seen when I say that whereas, by the two-number method, one toll board occupying one floor of the Cortlandt street exchange is sufficient, there would be required, if the particular-party method were employed exclusively, as many as five or six toll boards occupying five or six floors in the Cortlandt street building, and requiring five or six times as many operators for their working.

Another example, perhaps even more far-reaching in its effect upon the work of the engineer, is the question of whether the telephone company shall charge for its service on the flat-rate plan, or by messages as is now generally the case in this neighborhood.

Under the flat-rate method of charging, in large cities, the more times the customer uses his telephone during the day the greater is the expense to the telephone company. This is due not only to the increased number of operators required, but also to the increased switchboard sections needed for them and to the increased trunk-line plant. By the method of flat-rate charging there is no motive for the telephone company to encourage an increase in the number of calls. For this reason a flat-rate plan would have to be so engineered and the rates would have to be so established that extension stations, desk stands, and other auxiliaries tending to make the use of the telephone easy and therefore more frequent, must be discouraged.

The existence of the flat-rate in such cases would not only be attended by all of these consequences, but many others, one of which is of great importance. I refer to the excessive use of the subscribers' line which such a rate engenders. The consequence of this excessive use is that the busy calls attain such serious proportions that it is difficult, if not absolutely impossible, to give satisfactory service. This trouble from busy calls has at times attained such serious proportions that engineers in various places have exerted extraordinary efforts to mitigate the evil, but without success. This difficulty having been caused by commercial methods could not be overcome by the engineer employing physical methods. The solution of this difficulty lay with the business management and consisted in the adoption of a proper system of message rates.

As soon as the message-rate system was adopted all of these difficulties disappeared, and many positive advantages not even suspected as residing in the message-rate plan developed. Under the flat-rate system there was every temptation for the subscriber to send as many calls as possible over one line. Those having but small use for a telephone could not afford to pay the high flat-rate which that method of working made it necessary for the telephone company to charge. The consequence of this was that only those having a large number of calls installed a telephone, and those having small use of the telephone made it a practice to use the telephones of their neighbors or did not employ the telephone at all. This practice on the part of the small user was a natural one in view of the fact that under the flat-rate the telephone subscriber considered that it cost him nothing to allow his neighbor to use his telephone. All of this resulted in a system largely composed of overloaded lines. Under the conditions obtaining in our large cities, the relief of an overloaded line can be obtained only at the expense of a second line, which in most cases meant doubling the cost of the telephone service.

By introducing into the large cities the message-rate system, and by placing proper limits on the load with should be carried upon one line, and by providing a graduated system whereby additional lines could be obtained on a basis proportionate to the amount of their use, relief from this overloading was afforded. More than this, under the message-rate system it is obviously for the interest of the telephone company to encourage the use of the telephone in every manner. For this reason it became feasible and desirable to install as many auxiliary instruments as possible. This was accomplished by providing for those who required two or more lines a switchboard located at the subscribers' premises, this switchboard being so constructed that as many local stations as might be required could be installed at a moderate equipment charge. Each one of these stations is so equipped that it may be connected with a trunk line to the central office or it may be connected to any of the other local stations without communicating with the central office. In this way not only was the central office substantially changed, but a very important advantage was obtained. Talking between local stations at a local or private branch exchange switchboard could be accomplished without any message charge. This development not only reacted upon the central office engineering and the general engineering of the plant, but also completely changed the state of affairs with reference to speaking-tube telephones, practically limiting the former speaking-tube system to special and peculiar conditions.

Considering these two examples of the method of charging which shall be followed upon toll lines and the method of charging which shall be adopted upon subscribers' lines, it will be seen that they in a most extraordinary manner affect the work of the telephone engineer. So profoundly do such considerations affect the proper engineering of the telephone plant that it must be said that good telephone engineering cannot exist side by side with a bad system of rates or with improper business methods and organizations. Nothing more forcible than these examples needs to be mentioned in order to show the intimate relation between telephone engineering and business management.

(To be continued.)

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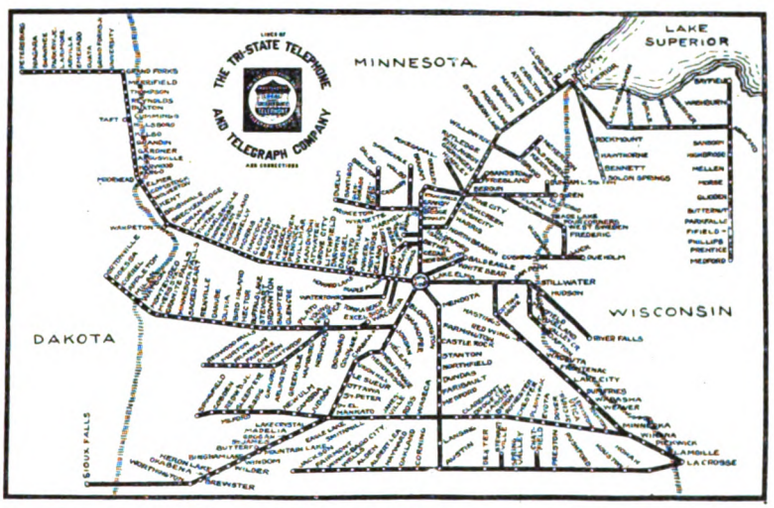
Cost of Conduit Construction

AT the recent meeting of the Northwestern Electrical Association, at Chicago, Mr. W. D. Burford presented a paper on underground construction as used by a new electric lighting and power plant, at La Crosse, Wis. This paper, although treating especially of conduit construction for the use of electric transmission, is valuable to telephone engineers because it gives the cost of such construction as actually carried on in a small city.

In the following table the prices are based on 2x12.-in. hemlock planks for foundation for the conduit, with a similar plank covering the work—hemlock at $20 per thousand; Portland cement at $1.60 per barrel; conduit layers at 30 cents per hour; trenchers and common laborers at 17½ cents per hour; conduit at 5 cents per duct foot. The following table shows the cost of laying multiple duct conduit per lineal foot:

No. of ducts.	Labor.	Mat'l.	Repaving— Brick.	Repaving— Macadam.	Sand.	Total.
4	$.25	$.39	$.39	$.20	..	$1.23
6	.28	.57	.39	.20	..	1.44
8	.45	.65	.39	.20	..	1.69

Mr. G. B. Springer, civil engineer of the Chicago Edison Company, in discussing the paper, gave the following data on conduit construction in Chicago: The principal qualifications of a good conduit are practical indestructibility and freedom from disintegration by fire, water, acids, alkalies or electrolysis. A smooth inside surface is desirable to permit of easy drawing in of cable; also a style of conduit permitting of economical installation in crowded streets. The vitrified clay conduit has so far been found to be the kind most nearly attaining these requirements. These conduits are made in both single and multiple duct, the single being about 3.5 in. in diameter, or 3.5 in. square, and 18 in. long. Multiple conduit is made in two, three, four, six and nine duct sections, two to three feet long.



This map shows the extensive Independent system by means of which farmers on countless branch lines are kept in touch with the cities, and city merchants may communicate with business men in all other towns within the indicated boundaries.

The single-duct conduit is best adapted for use in streets crowded with gas, water and other pipes, as the conduits may be divided into several layers crossing over or under the many obstructions found in the streets of large cities. A conduit construction which is made up of single ducts where each horizontal and vertical joint is broken, also has the additional advantage of preventing fire from spreading from one duct to another, as might occur in multiple conduit. The multiple conduit is, however, well calculated to be used in outlying communities where there are not many obstructions, particularly in lines of from two to four ducts. This style of conduit is somewhat cheaper to lay than the single duct.

In laying the conduit a trench is dug sufficiently wide to allow three inches of concrete to be placed on each side of the ducts, and of sufficient depth to allow at least 30 in. of concrete on top of the top layer of concrete. Three inches of concrete is laid in the bottom of the trench also, thus insuring a concrete protection of three inches on all sides of the ducts. The trench is graded from some point near the middle of the block to the manhole at each intersection, or from one manhole to the other, as the case may be, at a gradient of about 2 in. or more to 100 ft. of trench.

In laying the single duct tile the ducts are placed close together, the joints and triangular spaces in the corners being plastered and filled with cement mortar, of a mixture of one part cement to one part of sand. A wooden mandrel about four or five feet long and three inches in diameter, with a rubber or leather washer from three to eight inches larger on one end is drawn through each duct as the conduit is being laid; this is to insure any foreign particles or cement which may have gotten into the joints being drawn out. It also insures a good alignment.

A bricklayer is generally used in installing the single-duct conduit, the cost being slightly more for a bricklayer and helper than for three ordinary laborers as used in placing the multiple conduit. A good man, however, will lay from 1,600 to 2,200 duct feet of single-duct conduit in an eight-hour day.

In regard to the cost of conduit construction, as Mr. Burford says, there are many varying figures given off-hand. The vast difference in local conditions makes it very difficult to give a set of figures which will hold good in many places or in fact in the same place under different circumstances. There are often obstructions causing several feet difference in depth of trench, additional material and labor required, etc., to be considered as well as variations in cost of material, labor and number of ducts installed.

The following table, however, is submitted as a guide in approximating the cost of work of this character as a result of conduit construction covering ten years in Chicago. The cost of manholes is not included in this table, but is given in the one following table for estimating cost of conduit per duct foot, in different groups, in various pavements:

Kinds of pavement.	Number of ducts. 2	4	6	9	12	16	20	25	30
No pavement	$.18	$.18	$.18	$.18	$.18	$.18	$.18	$.18	$.18
Macadam	.24	.21	.20	.20	.19	.19	.19	.19	.19
Cedar	.26	.22	.21	.20	.20	.19	.19	.19	.19
Cedar reserve and granite.....	.31	.24	.23	.21	.21	.20	.20	.20	.19
Granite reserve	.43	.31	.28	.24	.24	.23	.22	.21	.21
Asphalt and brick reserve	.68	.43	.37	.31	.29	.26	.24	.24	.23

Table showing cost of conduit per duct foot in Chicago.

The following table contains approximate figures based on conditions prevailing in Chicago, and may be used as a guide in estimating the cost of conduit construction in connection with the table preceding. These figures were compiled for use in estimating total cost of manholes in different kinds of pavements:

Kinds of pav't.	Size of manholes in feet— 3x3′	3x4′	4x4′	4x5′	5x5′	6x6′	6x7′ $142	7x7′ $160	8x8′ $189	9x9′ $222
No pavement	$41	$47	$53	$64	$109	$133	$142	$160	$189	222
Macadam	42	48	55	66	111	135	146	163	193	226
Cedar	43	49	56	67	112	136	146	164	194	227
Cedar reserve and granite ..	44	50	57	68	113	138	149	167	198	231
Granite reserve..	46	53	60	72	117	144	155	174	207	243
Asphalt and brick reserve..	50	58	67	80	126	156	168	188	224	264

Table for estimating total cost of manholes in different kinds of pavements.

The above figures are based on the same prices for repaving,

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labor, bricklayers, cement and sand, as given in the table for conduit, and upon the following unit prices:

Brick work including labor and material	$12.50 per cu. yd.
Concrete tops and bottoms	$7.50 per cu. yd.
Back water gates	$6.50 each
Sewer grates	30 cents each
Sewer connections	$12.50 each
Sewer permits	$5.50 each
Manhole frames and covers	$15.00 each

PLANS FOR MERGING MISSOURI INDEPENDENT ASSOCIATIONS OUTLINED AT CONVENTION.

INDEPENDENT telephone men, representing about 100 Missouri companies at the convention held at Kansas City on February 22 and 23, have worked out a plan for the merging into two organizations of the separate concerns composing the Missouri Independent Telephone Association. Those in districts 1, 2, 3 and 4 will be merged into a northern company and districts 5, 6, 7, 8 and 9 into a southern company. The property of each exchange or company coming into the merger will be appraised and stock in the new company to the amount of the ascertained value of each plant will be issued.

The delegates from each district were called upon to express the general sentiment on the subject of the proposed merger of the telephone men whom they represented, and it was found that there was not a particle of opposition.

The details of the formation of the two companies were intrusted to a committee for the whole state composed of G. W. Schweer, Windsor; J. F. Barnett, Rutledge; Ed Hook, Appleton City; W. B. Scruggs, Harrisonville; Houck McHenry, Jefferson City.

The delegates present perfected the organization of the Independent Telephone Association of Missouri, with the election of the following officrs:

President, W. B. Scruggs, of Harrisonville; secretary and treasurer, Houck McHenry, of Jefferson City; nine vice-presidents, one from each district, as follows: First, A. T. Ralston, Maryville; second, G. A. Barnes, Hamilton; third, Houck McHenry, Jefferson City; fourth, C. O. Raines, Canton; fifth, W. Roy McCanne, St. Louis; sixth, G. W. Schweer, Windsor; seventh, J. W. Lane, Lamar; eighth, J. W. Hale, West Plains; ninth, unfilled.

The following are the names of the counties in each of the Missouri districts: District No. 1—Atchison, Nodaway, Worth, Harrison, Holt, Andrew, Gentry, DeKalb, Clinton, Buchanan, District No. 2—Mercer, Putnam, Grundy, Sullivan, Livingston, Linn, Caldwell, Ray. District No. 3—Schuyler, Adair, Macon, Randolph, Munroe, Howard, Audrain, Boone, Gallaway, Cooper, Saline, Cole, Monteau. District No. 4—Scotland, Clark, Knox, Lewis, Shelby, Marion, Ralls, Pike, Lincoln. District No. 5—Warren, St. Charles, St. Louis, Montgomery, Osage, Gasconade, Franklin, Jefferson, Maries, Phelps, Dent, Crawford, Washington, Iron, St. Francois, St. Genevieve. District No. 6—Platte, Clay, Jackson, Lafayette, Case, Johnson, Pettis, Bates, Henry, Benton, St. Clair, Hickory. District No. 7—Vernon, Cedar, Barton, Dade, Jasper, Lawrence, Newton, McDonald. District No. 8—Miller, Camden, Polk, Dallas, Laclede, Pulaski, Greene, Webster, Wright, Texas, Christian, Douglas, Stone, Taney, Ozark, Howell. District No. 9—Reynolds, Shannon, Wayne, Oregon, Carter, Ripley, Butler, Stoddard, Dunkin, New Madrid, Mississippi.

These delegates to the annual meeting of the national association, at St. Louis, next June, were appointed:

Delegates—J. F. Barnett, Rutledge; W. Roy McCanne, St. Louis; C. J. Myers, Kansas City; A. T. Ralston, Maryville; G. W. Schweer, Windsor.

Alternates—M. L. Golliday, Holden; Dr. J. J. Newell, St. Joseph; Houck McHenry, Jefferson City; Ed Foote, Pleasant Hill; T. G. Taggert, Richmond.

President W. B. Scruggs was appointed the state member of the national executive council.

The following resolution was adopted just before the meeting adjourned:

"Resolved, By the Missouri Independent Telephone Association, that we request all farmers' mutual telephone companies throughout the state to incorporate under the laws of the state and operate in harmony with and co-operate with the Independent telephone companies in their localities, and become members of this association."

Several addresses of special interest were made during the session. J. F. Barnett, traveling secretary, spoke on the subject of the organization of the state into nine districts, and later the organization of these districts into a state association.

Theodore Gary, of Macon, vice-president of the National-Interstate Telephone Association, delivered an extremely interesting address on his experiences in financing small telephone companies.

H. C. Dougherty, of Concordia, addressed the convention along somewhat similar lines, giving instances where companies in other lines of business had followed the plan adopted by Mr. Gary and the telephone men of Missouri.

The convention adjourned sine die. The committee having the merger proposition in hand will report to the executive committee of the association, and is expected to be able to announce substantial progress within the next two months.

AUTOMOBILE EXHIBITORS EMBARRASSED BY LACK OF TELEPHONE FACILITIES IN PHILADELPHIA.

BELL methods for securing exclusive contracts are too well known to cause more than ordinary comment. An interesting example of the petty tactics employed to choke off an opportunity for competition which would cause it to make a poor showing before the public recently occurred in Philadelphia.

The Automobile Trades Association, which has been conducting expositions in the more important cities throughout the country has for its manager one Chester I. Campbell, who acts as dictator in the affairs of the company. Recently he had charge of an automobile show in the Pennsylvania city. Among the exhibitors were several firms who desired Keystone telephone service at their booths.

When the company started in to install the equipment this overlord of the Automobile Trades Association opposed the Keystone Company, having previously made arrangements with the Bell Company for exclusive service. Notwithstanding his opposition the Independent telephones were installed and continued in operation for about two days, when the wires were maliciously cut.

A temporary injunction was asked for, but as the show would have been over before a hearing could have been brought about, the matter was allowed to drop.

A good deal of feeling among the exhibitors was manifested against Campbell, and rightly so, because their business was materially affected. It is doubtful whether the Automobile Trades Association had anything to do with the matter, but if it did, it would be well for it to consider the business interests of the exhibitors who contribute to its support.

MERCHANTS AT JOHNSTOWN, PA., DECLARE IN FAVOR OF INDEPENDENT TELEPHONE SYSTEM.

THE Merchants' Association of Johnstown adopted at its last meeting the following resolution:

"Inasmuch as the Johnstown Telephone Company's rates are about one-half former Bell rates and it is giving a satisfactory service to over 3,500 connections with the Johnstown exchange district, and long distance service to all points desired by members of our association; be it

"Resolved, That in order to reduce the expense and annoyance incident to maintaining two telephones, we hereby declare ourselves as being favorable to supporting our home company, the Johnstown Telephone Company, exclusively, so long as it operates under the present policy, and maintains the present schedule of rates."

It seems to be the prevailing opinion nowadays in many parts of the country that one telephone is better than two, as the Bell companies have so long insisted, provided that the one connects with an Independent exchange.

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QUERIES

VOLTAGE OF A BUSY TEST.—(672.)

Will you kindly explain what is meant by a five-volt busy test? J. Q.

The voltage of a busy test is a term used to designate the difference in potential which exists between the sleeve of a multiple jack which is tested by the operator and the tip of her plug at the time when the test is made. To take a well known circuit as an example: In Fig. 672 we have shown the conditions which exist in the sleeve circuit at different times. For simplicity all except the most essential parts of the circuit have been omitted. There is shown the sleeve connection for multiple jacks J^1, J^2, J^3, going to ground through the 30 ohm resistance which is contained in the winding of the cut-off relay, not shown in the drawing. S^1 is the sleeve of a subscribers' operator's cord circuit, in the condition which occurs when the plug is connected to a line having the receiver off the hook, which causes the supervisory relay to be drawn up, shunting the supervisory lamp, which has a resistance of 120 ohms, by the resistance R^2, 40 ohms. The resistance R^1 83 ohms is inserted in the sleeve circuit between the lamp and the plug.

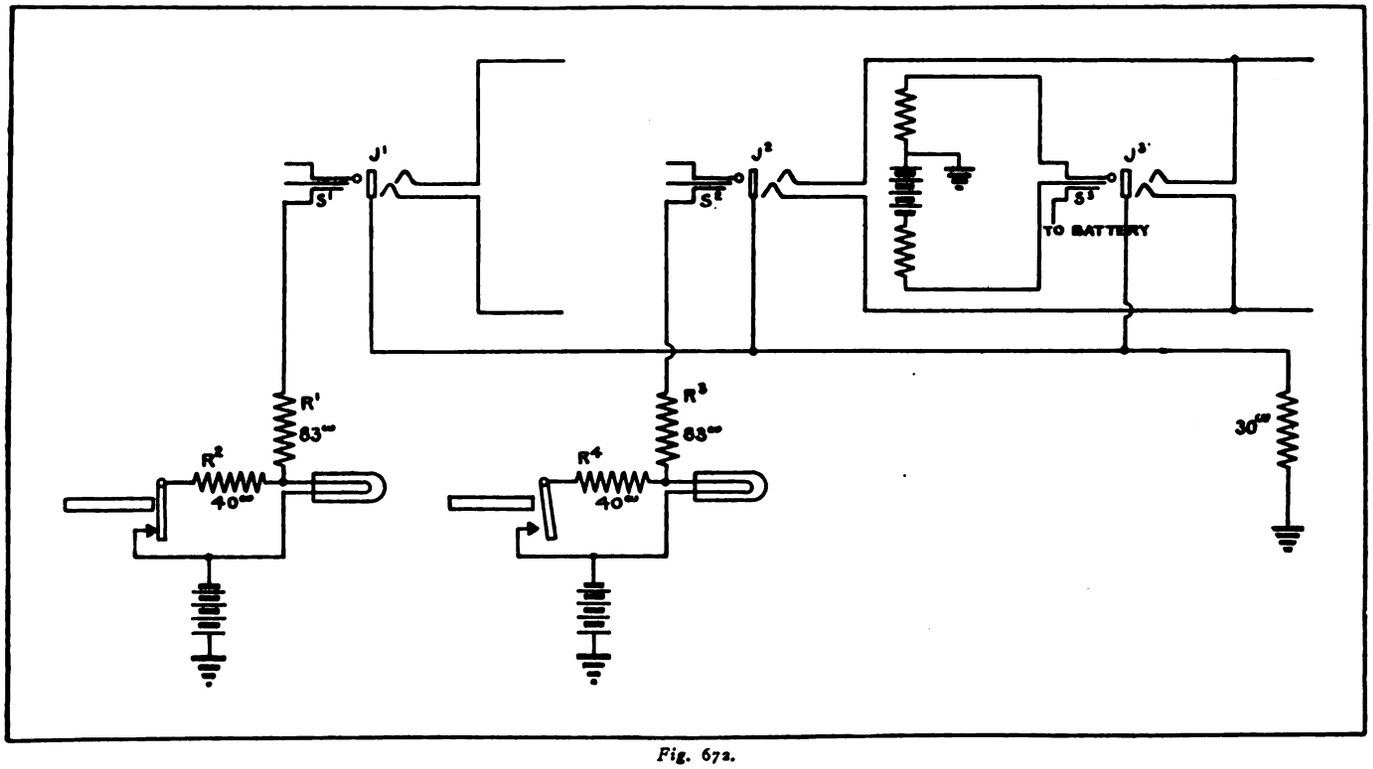

Fig. 672.

S^2 represents a similar cord circuit, with the exception that a condition is assumed where the subscriber has not answered and the telephone is not off the hook, leaving the lamp burning, as it is not shunted by the resistance R^4. Adjacent to the jack J^2 is a sketch outline of the cord circuit, which shows the tip of the plug connected through the winding of repeating coil to the grounded side of the central office battery. When no current is flowing through it, therefore, this plug tip is at ground potential.

Assume now that the sleeve S^2 is connected to jack J^2 by the insertion of the plug, and that operator tests jack J^2 to see if the line is busy. We find that the jack J^2, which, of course, will be at the same potential as J^2 and other sleeves in multiple with it, has been raised to a certain potential above the ground, due to the passage of current from the negative side of battery through the sleeve circuit connected to resistances, sleeves of plug and jack S^2 and J^2 respectively, 30 ohm resistance, etc., to ground.

The amount of this difference of potential may be readily obtained by considering the amount of drop in various parts of the circuit. For the sake of convenience, we will neglect the resistance of the wires in the switchboard cables, as it will be a very exceptional case where this resistance would exceed 1 to 1½ ohms. The potential is figured as follows: The resistance from negative side of battery through the lamp resistance R^3 is 203 ohms; the resistance of the entire circuit is 203 + 30 ohms, or 233 ohms. As the fall in potential throughout the circuit is proportional to the resistance of each part from the entire potential difference points J^2 or J^3 to ground will be $\frac{30}{233} \times 24$, which = 3.09 volts, provided that battery is charged to 24 volts pressure.

In the other case, which is the more usual one, where the supervisory lamp is shunted by the 40 ohm resistance, a different result is secured. Here, figuring the resistance of the circuit, we find the lamp and resistance coil give a combined value of

$$\frac{120 \times 40}{120 + 40} = \frac{4800}{160} \text{ ohms} = 30 \text{ ohms.}$$

The total resistance of this complete circuit is therefore 30 + 83 + 30 ohms = 143 ohms. The sleeve of jack J^2 will therefore be $\frac{30}{143} \times 24 = 5+$ volts above the ground potential.

As the tip of the plug of the testing operator is exactly at ground potential when it is touched to the sleeve J^2, a current with an electromotive force of between 3 and 5 volts, the amount depending upon the condition of the line and battery, will pass through the tip strand of the cord circuit, producing the familiar busy test click by its action upon the operator's receiving circuit.

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THE EDITOR'S PAGE

MULTIPLYING PROFITS.

THE efficient management of modern business enterprises depends much upon the elimination of delays. Edward B. Easton, general manager of the Columbia Phonograph Company, called attention to this fact in a very practical manner in an article which appeared in the current number of the magazine *System*. Mr. Easton has built up for his company a method of handling business which enables him to keep in the closest touch with all of the different departments and agencies.

By a plan which brings to his desk each day detailed reports he learns what is going on within an extremely short time in each branch of the company's business, no matter whether it is a department located in the same building with his office, or a foreign agency. These reports enable him to have at hand all information necessary for the determination of the proper line of action to pursue in the regular routine or in cases of emergency. After considering them it is important that all orders which are issued should reach the persons for whom they are intended with the smallest possible loss of time, and this the general manager accomplishes.

The telephone he has found to be one of the most important aids to the successful development of his plan for controlling the work of the company. He uses it constantly for getting into communication with the officers associated with him in the management of the business, and frequently urges the extension of its use by his subordinates. The superintendent of the shops may have an idea which is likely to effect a saving of a certain amount each day in the cost of manufacture of a given article. In order to put his idea into effect, it is necessary that he should receive the approval of some superior officer. Mr. Easton says that he should use the telephone. Then the matter is brought up as soon as the idea is formed; and, if it is a good one, it is given immediate consideration and approval, and is put in operation. The result of this is that a telephone message, costing almost nothing, results in the introduction of an economical process in a time which is from a single day to several weeks shorter than would be the case if it were brought up by correspondence. Each day that is saved represents a certain definite, and possibly large, saving in the expenses of the company, which is the difference in cost between the old method and the new. The percentage of profit on such a telephone message is enormous.

For use between offices in the same building the telephone also effects most important economies. In handling a given matter by correspondence, it is well known by all business men that whatever delays occur are not due to the time which is spent in the actual consideration of the subject upon which information is being gathered. The time that is lost is partly that which elapses while the papers bearing upon the matter are lying in one office after having been considered, waiting to be carried to the next person who will take up the affair.

When they reach the second man's desk there is a still further delay, which continues until he is able to direct his attention to the papers at hand. After examining them it is usually necessary for him to gather other correspondence and data which bear upon the case; and, as these data are usually obtained as the result of written applications, it is necessary that a certain delay should take place before the demands can be put upon paper. Still more time is lost in taking the request for information to the persons who are to gather it; after it has reached their desks there is a still further delay until they can take it up, and so on in an ever widening circle.

Telephone companies can find no better means of increasing the number of calls which they are to handle than by taking every opportunity to impress these facts upon the more conservative business men. There are still many large firms which do not understand that the success of competitors and others, which they so much admire, is due to the elimination of delays. They should be made to realize that a loss of time frequently represents an enormously disproportionate loss of profit, which could be saved by the use of the telephone.

IMPROVEMENTS FROM DISCUSSION.

CONVENTIONS give opportunities not only for learning methods of developing territory and gaining new business in a manner which is for the best interests of all the operating companies represented, but afford most valuable facilities for learning the advantages and defects of various methods of operation, construction, maintenance, etc. It is unavoidable where the system of handling details of work is controlled by men who are not closely associated, that considerable differences should exist. Methods will be built up which present important advantages and give good satisfaction to both companies and subscribers. When an Independent operator has devised good systems, it is to his interest to make them generally known to his associates. This is essential because the extension of his toll business demands that the companies with which he connects shall give as good service as his own. It is to his interest, therefore, to devote attention to their improvement as well as to that of the system owned by the company with which he is more directly concerned.

The discussion during the progress of association meetings enables operating men to take up various questions and consider them from every point of view. Thomas D. Lockwood, in a recent talk before the American Institute of Electrical Engineers, referred briefly to the early history of telephone development, when there were as many different circuits in use and different ways of handling business as there were exchanges. Each of these plans had been devised by the man controlling the exchange, who was in the habit of vigorously urging claims that his own was the very best system in use. It finally occurred to a number of the leaders, of which Mr. Lockwood was one, that there could really be only one best system. This led to a discussion, which was intended to be as fair and impartial as possible, with the object of picking out the genuine merits of each plan. From this time is said to have dated the consistent development of telephone engineering.

There still remain many differences of opinion which need to be adjusted, many special applications of different schemes which admirably suit different conditions, and which are not generally known, and many cases where no satisfactory plan for avoiding difficulties has been devised. It is extremely desirable, for the general development of the work, that these points shall be understood as thoroughly as possible by all men. This understanding should be not necessarily an agreement, but will enable each man to hold opinions based upon a foundation which is known to cover the idea from every point of view which can be suggested by interested persons. It is here that discussion at conventions, on account of the freedom which is possible, is of the greatest benefit to the operating men.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

NEGLIGENCE WHERE WIRE BREAKS FROM CONTRACTION.

I find your answers to questions on telephone law to be very helpful, and this alone is well worth the price of the paper.

I would like to ask a question in regard to a case where a telephone wire in town broke during a cold night from contraction and a kink in the wire; early the next morning, before working hours, a pedestrian while crossing the street ran into the wire. The wire caught in his teeth, throwing him down on his back, loosening his teeth and causing other injuries for which he proposes to collect damages. Is this a case of negligence on the part of the telephone company, and has he any grounds for action?

P. V. T. CO.

THE only point upon which a claim of negligence could be hung in the case you mention is whether the existence of the kink in the wire was due to the negligence of the company or not. If it was negligence for the company to allow a kink to remain in its wires in view of the fact of cold weather, which must be expected in your State (Nebraska), there would be a question for a jury, which would, of course, be likely to decide in favor of the injured man. The question for the jury would be whether cold weather is apt to contract wires to such an extent as to constitute a danger against which companies should provide. It was held that the negligence of the company was a question for the jury where a severe storm caused the sagging of the wire, into which plaintiff's wagon ran. Friesenham v. Mich. Tel. Co. 96 N. W. 501. On the subject of the contributory negligence of the pedestrian in crossing the street, see Miller v. Lewistown Company, 62 Atl. 32 in which case it was held that the traveler was not contributorily negligent.

LEVYING OF POLE TAXES ON FRANCHISED COMPANY.

About two years ago there appeared in the Legal Department of THE AMERICAN TELEPHONE JOURNAL a number of Court decisions holding that a municipality had no right to levy a special tax on poles of a telephone company after the granting of a franchise. We have this question up now and I will be much obliged to you for a list of decisions.

The question presented in our case is this:

Immediately after granting our franchise the City Council levied a tax or rather passed an ordinance requiring the payment of $1.00 per pole before permission to set poles would be given. I take the position that this was in violation of the franchise ordinance granted to our company and the contract between the municipality and ourselves when we accepted the ordinance. The ordinance itself imposed certain conditions by way of special tax on gross income and certain concessions as to number of free telephones granted to the municipality. E. B. J.

THE foundation upon which the authority to levy pole taxes rests is the supposed expense of regulating them on the part of the city. A tax upon poles over and above the expense of the regulation of them is not valid, but the courts uphold the levying of such an assessment per pole as will pay the expense to the city of police regulation, and the power under which municipalities are permitted to collect these fees is the police power. The following cases bear upon the subject: Memphis v. Postal Telegraph Company, 139 Fed. 707; Wisconsin Telephone Company v. City of Milwaukee, 104 N. W., 1109, in which it was held that license taxes upon poles in Milwaukee were void because the city was without authority to impose them; Pensacola v. Southern Bell Telephone Company, 37 Southern 820; Shellburg v. Western Union Telegraph Company, 26 Penn. Sup. Ct. 343, enumerating the elements that enter into a valid license tax; Burrough of Kittanning v. Western Union Telegraph Company, 26 Penn. State 346. In this case an ordinance imposing a pole license tax was not void because not restricted in express terms to poles and wires maintained upon highways and public property; City of Fort Smith v. Hunt, vol. 10, AMER. TEL. JOURNAL, No. 16; Postal Telegraph Company v. New Hope and Postal Telegraph Company v. Taylor, 5 Advance Opinions, U. S. Sup. Ct. 205; St. Louis v. Western Union Telegraph Company, 148 U. S. 92, 149 U. S. 465.

ANNEXED TERRITORY ENTITLED TO CITY RATES.

THE Supreme Court of Illinois has rendered a decision in the case of the People v. the Chicago Telephone Company. This company was chartered in 1889, and the charter contained a provision that the rates for telephones should not be advanced from the rates specified in the franchise. Since 1889 many improvements in service have been made, and the company made new contracts with a number of patrons for improved metallic circuit service, for which the company charged $50 per head per telephone in addition to the rate of $125 per year provided in the charter. The company also extended this service to several suburbs in which it had franchises, without any rate limitations and which were subsequently annexed to the city of Chicago. Quo warranto proceedings to forfeit the charter of the company were instituted in the Cook County Circuit Court, dismissed by that court, and appealed to the Supreme Court.

The Supreme Court holds that the company cannot charge rates in excess of those provided for in the ordinance granting the company its franchise, no matter what improvements it makes, and that the service must be given the suburbs which have since been annexed to the city at the same rate which prevails in the city. It says that the ordinance applied to all within the limits of Chicago and made no exclusion of territory that might come in later.

As to the service, the court says that the words of the ordinance are general and on their face include every kind of service and the court sees no warrant for saying that they do not include any improved service adopted by the company. To construe the ordinance as the company would means that whenever any improvement is made in service the company rids itself of all its rates and still enjoys the benefit of the ordinance. The court holds that the pleas set up do not warrant forfeiture of the franchise, but it directs the lower court to enter orders in accordance with the decision.

TO RECOVER PENALTY FOR DISCRIMINATION.

THE Attorney General of Wisconsin has started action against the Wisconsin Telephone Company for the recovery of $500 provided for by chapter 389 of the laws of 1905, to prevent one telephone company from charging a greater rental in one city than for like service in another city of the same class. The Wisconsin Telephone Company operates in some 30 cities of the state. The Independents endeavored persistently during the last three sessions of the legislature to obtain the passage of a bill to prevent discrimination. The Bell people resisted the movement Finally, in the session of 1905, a law was enacted classifying cities of Wisconsin according to size, and providing that any company maintaining exchanges in more than one place should charge the same price for like services of the same class. The offense alleged is the charging of higher rates in Beloit than in Janesville.

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IN THE OPERATING FIELD

INDIANA MEETING RESULTS IN ACTION TO INSURE STRICT INDEPENDENCE.

THE second quarterly meeting of the members of the Indiana Independent Telephone Association for the first district was in Elkhart on February 26. Affairs in the district were declared to be in excellent condition and twelve delegates were selected to attend the annual State meeting. Vice-President Thorward and Secretary Crow were reelected.

The following resolution was unanimously adopted:

"Resolved, That any telephone company in the first district having either direct or indirect traffic relations with the Central Union (Bell) Telephone Company, be cut off from all traffic relations with the Independent telephone companies of this district, providing such company refuses to sever its connection with the Bell company after receiving due notice to do so from the president and secretary of the district association."

BELL UNABLE TO RETAIN CONTROL OF TERRITORY ACQUIRED BY SUB-LICENSE CONTRACT IN NEW YORK.

SINCE the alliance of the Orange County (N. Y.) Telephone Company with the Bell interests the Middletown Telephone Company has been organized to give Independent service in Middletown and the surrounding district. This company intends to operate in connection with other Independent companies in Orange and Lowell counties in establishing an exchange in Middletown and has constructed a connecting line from Goshen to Middletown. The company obtained a right to enter the city in the face of vigorous opposition from the Hudson River Company. As soon as it was found, however, that the new company was aware of its rights under the laws of the State and able to procure them the efforts to prevent its entrance ceased.

The stockholders have chosen the following directors for the ensuing year: Dr. M. C. Conner, Dr. Edwin Francher, G. B. Potter, Galen Coleman, W. G. Comings, Dr. G. B. Hewlett, F. B. Walsh, C. A. Ketcham and W. C. Ramsdell. The new company has the confidence of the people, who have been so recently tricked by the sub-license arrangement, and will be able in a short time to build up an excellent system.

NEW COMPANY PROPOSES TO BUILD UP EFFICIENT SYSTEM IN PERRY COUNTY, OHIO.

THE Citizens' Independent Telephone Company, of New Lexington, was recently incorporated with a capital stock of $50,000 and promises much to the residents of Perry county.

The following directors were chosen: W. L. Cary, Jr., T. F. Wilson, J. L. Hoffman, S. M. Granger, John Mangan, T. J. Smith and J. B. Rhodes. The directors organized by electing the following officers: W. L. Cary, Jr., president; S. M. Granger, vice-president; T. J. Smith, secretary and general manager; J. B. Rhodes, treasurer. As the officers of the new company are men prominent in Independent telephone affairs in Ohio, the building up of a comprehensive and efficient service is assured.

The president for this company is general counsel for the United States Long Distance Telephone Company and the Federal Telephone Company, together with its various subsidiary companies, including the Zanesville Telephone & Telegraph Company and the Lancaster Telephone Company.

J. B. Rhodes, who has been elected treasurer of the new company, is secretary and general manager of the Zanesville Telephone & Telegraph Company, president and general manager of the Crooksville Telephone Company, also in the same capacities with the Adamsville Telephone Company, treasurer of the Woodsfield Telephone Company, secretary and treasurer of the New Concord Telephone Company, besides being prominently identified with the newly organized company at Caldwell.

Arrangements are to be made immediately for the establishment at New Lexington of a modern telephone exchange that will be capable of accommodating the whole of Perry county. The many towns and rural districts will be connected with the New Lexington exchange, and from there secure connections with each other or with outside points.

LARGE GIFTS TO INSTITUTE BUILDING FUND.

THE chairman of the Land and Building Fund of the American Institute of Electrical Engineers, announces this week some very large and important contributions to this fund, the object of which is to raise $200,000 for the land on which the United Engineering building, given by Mr. Carnegie, is now being erected. The total cost of the land is $540,000, and the obligation is divided between the electrical, mechanical and mining engineers.

Mr. Clarence H. Mackay, president of the Postal Telegraph-Cable Company, has given $5,000 to the fund, accompanied by the expression of his interest in the building as a center whose facilities will be available to the various bodies of telegraphers. Mr. U. N. Bethell and Mr. J. J. Carty, members of the committee, have advised it on behalf of the American Telephone & Telegraph Company, the Western Electric Company, the New York & New Jersey Telephone Company and the New York Telephone Company, that these corporations have jointly contributed $25,000 to the fund, in view of the great benefits that the existence of this new engineering center will confer upon the electrical arts and upon their employees in the widening field of telephone engineering.

Other notable gifts to the fund are $1,200 from Mr. E. W. Rice, Jr., and $500 from Mr. T. D. Lockwood. A number of subscriptions of lesser amounts have been received from the institute membership at large, and in this manner the fund has now reached the total of over $130,000, or two-thirds of the required amount. With the campaign it has already inaugurated, and the plans now maturing, the committee is hopeful of having the entire sum pledged before the institute moves into its new home.

BELL OUTWITTED IN KENTUCKY.

INDEPENDENT development in the South has recently received a new impetus through the efforts of J. E. Zeluff, of Birmingham, Ala. Mr. Zeluff, who is superintendent for the Central Telephone Construction Company, recently gave the Bell Company a most effective setback at Russellville, Ky. At this place the Bell had for a long time successfully opposed all efforts for the establishment of an Independent system. The manager of its exchange had held the position from the outset and had been mayor of the city for the past seventeen years. The whole council was also extremely sympathetic with the Bell interests, and it is doubtful whether the Independents would have been able to gain a foothold had not the Bell pursued its usual practice of giving poor service with antiquated equipment.

The townspeople were thoroughly disgusted with the actions of the company, and were in favor of an Independent system. Throughout the rest of the State the Independents are particularly strong and the business men realized that a large amount of

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FOR SALE—Cheap, 9 sections, American Electric, express, magneto switchboard; we will sell one or all; 500 magneto telephones; 100 magneto desk sets; 200 generators, all types; 100 bipolar receivers; 200 ringing coils; 80 to 120 ohm. Address the Tuscarawas County Telephone Company, New Philadelphia, O. 571

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—1,800 line, multiple, lamp signal, Central energy switchboard of latest Stromberg-Carlson make. Just from the factory. Not yet unpacked. Terms to suit. Also modern telephone exchange and electric light plant in progressive South Carolina town of over 2,000 inhabitants, $14,000; $3,000 cash; balance on easy terms. Piedmont Electric Co., Anderson, S. C. 563

THE Armstrong Telephone Exchange Company wishes to bond their company for $5,000, and wishes to correspond with any company who is interested in making loans. Address R. O. Armstrong, Secy., Truman, Minn. 568

FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

FOR SALE—300 Eureka Express Switchboard drops and other parts. Kellogg Keys. Write for prices. The Lyons Telephone Co., Lyons, Kan. 573

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WANTED—Two experienced inspectors for central energy system in middle west. Must be hustlers and well recommended. Address Box 564, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 564

WANTED—Position as manager. Have had 14 years' experience in all branches of the business from the ground up. Past eight years have managed and superintended construction. Married and temperate. Very best of recommendations. Address M., 2119 A, Cass avenue, St. Louis, Mo. 552

WANTED—Wire chief for Central Energy system in middle west; state experience in this class of work. Address, Box 567, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 567

WANTED—Correspondent. Must be able to write strong, forceful letters—the kind that turn inquiries into orders. Experience in dictating telephone and switchboard letters on magneto and non-multiple central energy apparatus necessary. Will pay good salary to right man. Give full particulars. Largest Independent company. Address, Box 562, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 562

WANTED—Position by an all round cable splicer and switchboard man. Best of references furnished. Address Frank R. Rice, Menomonie, Wis. 572

WANTED—Position as chief operator. Have had 10 years' experience. Can furnish best of references as to qualifications. Address Box 574, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 574

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trade was being diverted to other points on account of lack of Independent connections.

To enable the Independents to come into the city a new mayor and council were nominated and run on the Independent telephone platform. At the primaries it secured a unanimous vote, which gave it a majority of over 200. The Bell, realizing its defeat, immediately set to work and circulated promises by the score. New construction was started and rebuilding of the entire plant was commenced. At the same time it began to secure names for a petition to be presented to the new council protesting against another telephone franchise, but all without avail. The franchise granted the Independent company is exactly the same as the one under which the Bell is operating, and will enable it to do business without let or hindrance. An amusing feature of the contest was the protest made against the granting of so liberal a franchise to the Independent company, when it contained not a single privilege denied to the Bell.

MERGER OF LARGE INDEPENDENT INTERESTS IN OHIO ANNOUNCED.

ANNOUNCEMENT was made at the annual meeting of the Columbus Citizens' Telephone Company that the company had perfected a lease of the plants, exchanges and rights of the Franklin Telephone Company. The lease was announced as of January 1, the property having been quietly taken over at that date without giving notice to the public, subject to ratification of the Franklin County Company stockholders. On February 20 the lease was unanimously ratified by these stockholders.

		INDEPENDENT.				BELL.		
County	County Seat	Number of Telephones	Number of Exchanges	Number of Toll Stations	Number of Stockholders	Number of Telephones	Number of Exchanges	Number of Toll Stations
Muskingum	Zanesville	2,743	18	22	50	2,306	8	13
Noble	Caldwell	1,237	9	27	36	0	0	7
Ottawa	Port Clinton	1,395	7	23	102	75	2	7
Paulding	Paulding	1,222	5	14	67	216	3	8
Perry	New Lexingt'n	410	2	4	95	460	1	4
Pickaway	Circleville	1,370	4	26	40	500	1	12
Pike	Waverly	410	5	27	13	25	1	8
Portage	Ravenna	2,018	8	24	38	352	1	14
Preble	Eaton	2,543	9	18	182	80	1	15
Putnam	Ottawa	1,871	12	19	25	20	0	6
Richland	Mansfield	4,038	8	18	137	1,978	3	1
Ross	Chillicothe	1,908	4	42	100	775	3	20
Sandusky	Fremont	2,475	5	0	102	403	1	3
Scioto	Portsmouth	1,545	1	1	29	650	1	1
Seneca	Tiffin	3,383	9	26	79	1,357	4	9
Shelby	Sidney	1,409	5	17	72	161	1	16
Stark	Canton	5,628	11	36	186	3,365	7	29
Summit	Akron	4,389	8	22	114	3,060	4	14
Trumbull	Warren	2,830	5	6	161	0	0	15
Tuscarawas	New Phila'pha	3,084	12	32	96	650	3	7
Union	Marysville	1,366	6	4	25	50	1	1
Van Wert	Van Wert	2,583	10	13	294	4	0	6
Vinton	McArthur	0	0	0	0	0	0	4
Warren	Lebanon	1,030	6	16	140	450	2	0
Washington	Marietta	1,307	3	5	34	1,040	2	5
Wayne	Wooster	2,713	5	5	25	0	0	0
Williams	Bryan	2,510	8	16	131	150	1	15
Wood	Bowling Green	2,188	10	35	340	697	5	3
Wyandot	Up. Sandusky	1,020	2	6	44	495	4	1
Totals,		60,625	197	504	2,757	19,319	60	244
Totals for the State,		227,271	695	1,604	18,239	108,991	219	842

Comparative table of telephone situation in 29 Ohio counties. This is a continuation of the statement prepared by President F. L. Beam, commenced in our issue of March 3.

The owners of both systems have been the same for some time, but the lines have been managed by different directorates, although members of one directorate have at various times been on the other board. The same board now directs the affairs of both companies, and the same officers conduct the business, while the accounts are kept separately.

The combined companies have a list of 10,000 subscribers in Franklin County, on the city, village and rural lines. The exchanges thus consolidated with the Citizens' companies are those of Worthington, Westerville, New Albany, Gahanna, Reynoldsburg, Pickerington (in Fairfield County), Canal Winchester, Groveport, Lockbourne, Grove City, Harrisburg, Galloway, Hilliards and Dublin. Seth L. McMillen was president of the Franklin County company, and Ralph Reamer was secretary.

The basis of the lease is a guaranteed dividend of 5 per cent. annually on the stock, $150,000 par value.

The Citizens' Company elected a Board of Directors as follows: Henry A. Lanman, John Joyce, Edwin R. Sharp, Frank A. Davis, J. B. Hanna, L. D. Haggerty, C. C. Griswold, Harry M. Daugherty and Frank L. Beam. The board organized by the election of Henry A. Lanman, president; John Joyce, vice-president; Edwin R. Sharp, secretary and treasurer; Frank A. Davis, general counsel, and Gansey R. Johnson, general manager.

C. H. JUDSON TO HANDLE DEVELOPMENT OF INDEPENDENT PLANT AT SEATTLE.

THE Seattle, Wash., Independent Telephone Company has recently put its engineering work in charge of C. H. Judson. He is now chief engineer of the company, and expects to remove to Seattle within the next two months to take up his permanent residence there. His experience in the construction of the high grade plants in St. Paul, Minneapolis, Kansas City, Des Moines, Council Bluffs and other important places will enable the company to meet the exceptional demands for rapid construction imposed by the necessity of giving service to a list of subscribers which is increasing with extraordinary speed. The recent citizens' movement against the Sunset Company is likely to result in a sudden extension of the plant of the Independent Telephone Company at a rate which has been unequalled in the history of the Independent movement. Mr. Judson himself says that the company's business is growing so rapidly that it is going to require all the men and material that they can lay their hands on to keep up with the contract department.

COLONEL DICKSON LEAVES THE TELEPHONE FIELD.

FREDERICK S. DICKSON has recently associated himself with a brokerage firm, and will shortly undertake the management of its business in Cleveland. He has tendered his resignations as president of the various telephone companies of which he is now the head, and expects that these resignations will be accepted as soon as successors have been decided upon.

Mr. Dickson was placed in charge of the telephone companies at a time when their financial condition was especially weak, and he has succeeded in building up each of the properties which he has managed to a place where it is able to stand on a firm and substantial basis. The companies have developed rapidly in the face of determined opposition. He has given good service and won the confidence of the public, both as subscribers and as investors.

The companies with which he has been associated will still have the benefit of the strong and active organization of able and well trained men, which he has built up since he came into control. He leaves the telephone field as one who has most ably and completely accomplished an important and useful task. Col. Dickson in a recent letter to THE AMERICAN TELEPHONE JOURNAL stated that he desired to express his gratitude for the many acts of courtesy and generous treatment at the hands of his telephone brethren throughout the United States, and to say that his connection with the telephone business had been most agreeable to him personally.

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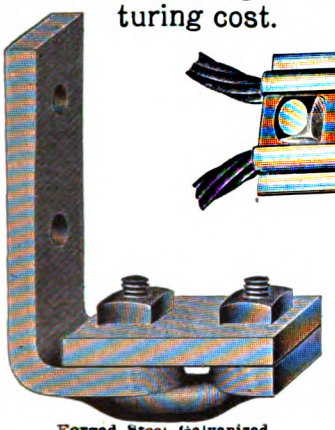

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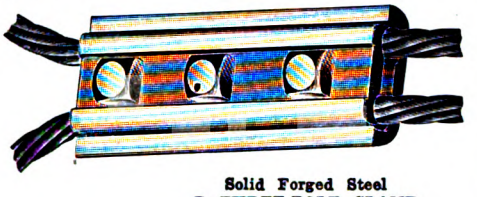

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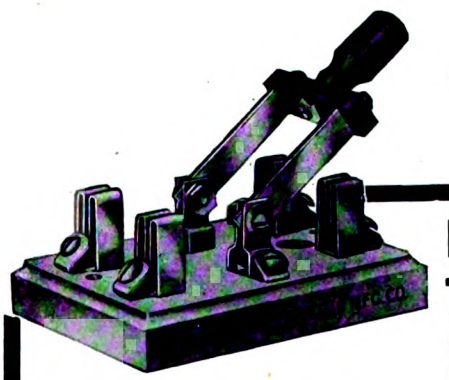

All Copper. Made in 4 Styles

Do You Know That in Your Exchange

there is at least one, and probably a dozen or more places where you should use TRUMBULL ALL COPPER SWITCHES. For instance, in your operators' transmitter circuit, to change from one battery to the other; in the battery circuit of the pole changer; or in connection with your source of power and ringing currents. It is a switch which differs in essential details from any other. The contact springs are designed to furnish perfect contact with the knife blades indefinitely. This is on account of the inverted U formation which gives the maximum of spring movement with the least wear.

We shall be pleased to quote you prices or give you any other information.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Ave., PLAINVILLE, CONN.

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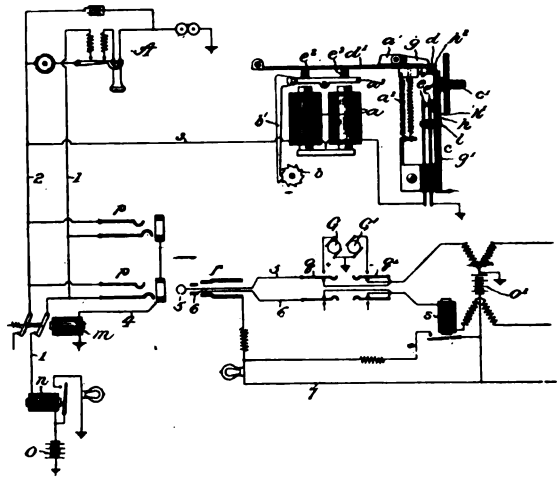
TELEPHONE PATENTS

SERVICE METER.

Frank R. McBerty, Evanston, Ill., and Edward B. Craft, Chicago, Ill., patent (No. 813,230; dated Feruary 20, 1906; filed June 10, 1905; serial No. 264,565) and assign to the Western Electric Company, of Chicago, Ill., a service meter for telephones.

The object of this invention is to provide means at the substation for recording the number of completed calls by an instrument which shall be under the control of the exchange operator after the calling party has first operated the mechanism which lights his line lamp. Referring to the illustration, the meter consists of a polarized electro-magnet *a* provided with a centrally pivoted armature a^3. This armature when tilted in one direction operates, by means of the lever or pawl b^1, the registering train *b*. A switch, *c*, is provided to control the circuit connection of the magnet *a* and is operated by plunger c^1. When the plunger is depressed catch *d*, carried by arm d^1 which is pivoted on post a^1, locks the switch springs in such a position as to close contacts *e* e^1.



The armature carries two studs adapted to operate the arm d^1 according to the movement of the armature. A spring, a^2, normally holds the arm against the studs.

To prevent the mechanism being tampered with after the button has been depressed, a guard *g* is interposed between the tension or operating member g^1 and the button.

In operation the receiver is removed from the hook and the button c^1 depressed, which locks the switch springs *e* e^1 in position. A circuit is then completed from battery *O*, through line relay *n*, over conductor 1, instrument *A*, wire 3, magnet *a*, switch springs *e* e^1 to ground. The line relay is thus energized and closes the signal circuit. The service meter is arranged not to respond to current from battery *O*. When the operator answers the call by inserting the plug *r* in the jack *p*, the cut off relay *m* operates and the line circuits are connected to wires 5, 6. If the call is completed the proper key, either *q* or q^1, is depressed, to send current of the right polarity to energize the magnet *a*, causing it to tilt its armature in the direction to operate the registering train *b* and release the switch springs *c* c^1. If, however, the call is cancelled, the opposite button would be operated, causing current of a reversed polarity to traverse the windings of magnet *a*, which thereupon tilts its armature a^3 in the other direction, releasing the switch springs, but not operating the registering device.

PARTY-LINE SYSTEM.

Edward A. Buell, De Kalb, Ill., patents (No. 811,691; dated Feb. 6, 1906; filed Mar. 17, 1905; serial No. 250,621) a party-line selective system.

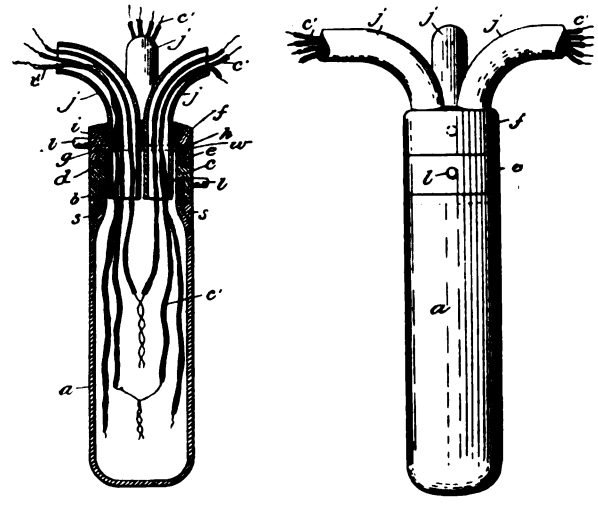
This invention relates to that class of selective systems employing step by step mechanism. Two magnets are employed, one of which operates a ratchet wheel to close or open local circuits, and the other governs the relation of the circuits through the former magnet. A special key at the exchange is provided by means of which the operator can connect the instrument of a party calling to the line, and also select any party.

Under normal conditions the signaling generator alone is capable of being connected to the line without the aid of the operator; thus secrecy is secured.

CABLE SPLICING DEVICE.

Charles E. Teush and Luther Hargis, Evansville, Ind., patent (No. 802,337; dated October 17, 1905; filed March 27, 1905; serial No. 252,330) and assign one-third to Charles M. Katterjohn, Evansville, Ind.; a moisture proof covering for the terminals of armored cables.

The object of this invention is to provide means whereby the terminals or splices of cable wires can be protected from moisture by a covering which can be readily removed and replaced when inspection is necessary. The covering for the joint consists of a lead tube, or casing, *a*, which is permanently closed at one end. The end of the case through which the wires enter is provided with a brass crown *c*, designed to be attached to the main portion by means of the offset *b*, which is to be "sweated" firmly to the case *a*, and reinforced by solder, *s*, if desired. The crown is provided with a shoulder *d* and threaded portion *e*, which engages with the tapped interior of a cap *f*. A leaden gasket *h*, attached to the middle of the interior of the cap, is provided with as many holes as there are to be cables to be spliced or terminated at this point. The upper interior portion of the cap is bevelled off to form a shallow cup, as shown at *i*.



In use cables are introduced through the openings in the gasket. Hot lead is then poured into the cup above mentioned, to attach the cables firmly thereto, and to prevent the entrance of moisture. After the splice is completed the casing *a* is placed over the wires and screwed down tightly upon the cap. A rubber or other suitable washer *w* is interposed between the edge of the casing and the leaden seat to make a completely moisture-proof joint.

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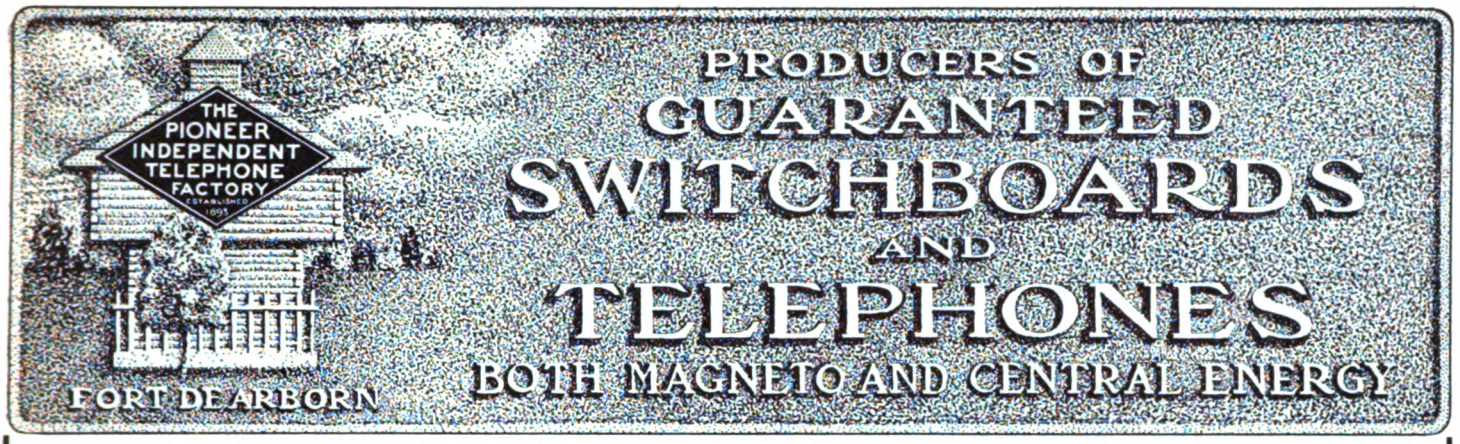
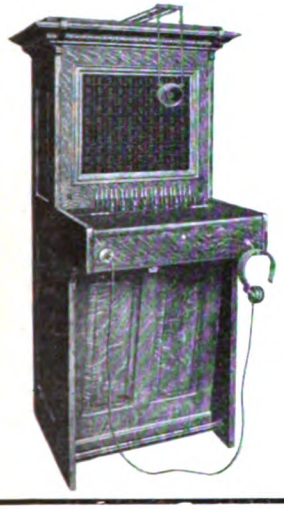


PRODUCERS OF GUARANTEED SWITCHBOARDS AND TELEPHONES BOTH MAGNETO AND CENTRAL ENERGY



MAGNETO SWITCHBOARD
STYLE "G"

What Appeals to You Most When Purchasing—Reason or Bald Statements?

We guarantee every instrument we produce as well as every one of its parts to give satisfactory service to the purchaser with the privilege to him of returning the goods to us, we to pay transportation charges both ways. We have sold to many others and have satisfied the most careful purchasing agents that our apparatus is scientifically designed, mechanically well built and electrically efficient and correct. A letter or postal will bring you our catalogues, specifications and price lists.

Western Telephone Manufacturing Co.

THE PIONEER INDEPENDENT TELEPHONE FACTORY

Established 1893. No. 58 West Jackson Blvd., Chicago

TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three

Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

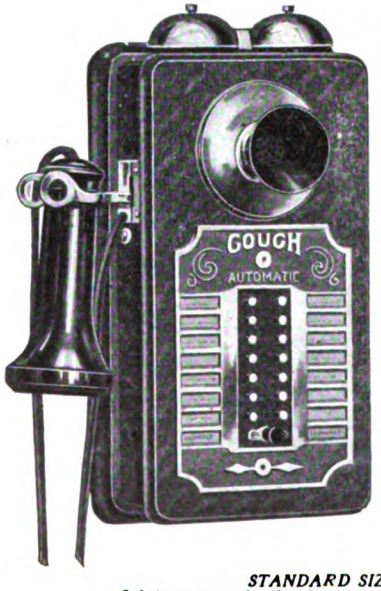
Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company

400 Eddy Street, Sandwich, Ills.

A New Source of Revenue



is at the disposal of every progressive telephone company. We have perfected an automatic intercommunicating system which takes the place of the branch exchange, furnishing better, quicker and cheaper service than was possible heretofore. Exchange connections at each station. There isn't a company in the country which cannot use these systems. Many are. Why aren't you?

Trunk Button

Write for particulars

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

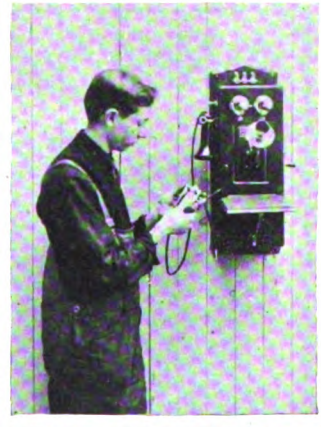
CONDENSERS FOR PARTY LINES.

FOR bridging telephone systems the use of a condenser at each station is said to do away with one of the most prevalent difficulties which impairs the operation of party lines. The tendency on the part of telephone users to forget to hang up their receivers is the cause of frequently occurring trouble. Moreover, it is said that upon lines which go through districts which are thickly settled, a ring upon a line is very likely to cause more than one person to take down his telephone and listen. Although each of the listeners will no doubt deny any intention to attempt to remain on the line and overhear the conversation, the fact remains that if the party desired does not respond to the first ring it is very difficult to obtain him afterward. The trouble in each case is due to the fact that the ringing current intended for his bell is shunted through the receivers of all of the other listeners.

The condensers manufactured by Julius Andrae & Sons Company, 99 Second street, Milwaukee, Wis., are designed to be installed in the receiver circuit, and do away with the difficulty we have mentioned. By their use it is said that the bells will give a strong ring even when several receivers are off the hook.

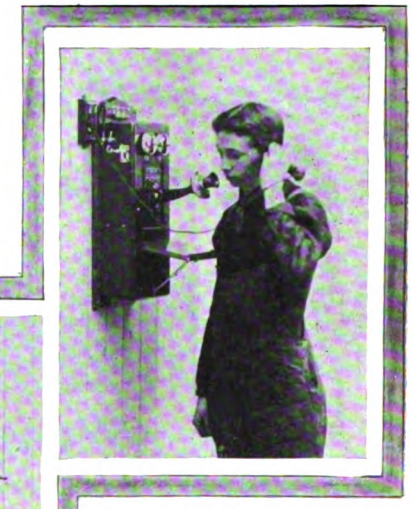
The company makes several types of condensers, which are adapted to various locations. One type, the "Special" condenser, is so small that it may be readily installed inside of a bridging magneto box. This is for use where the instrument is crowded into a small space. The "Standard" condensers are uniformly designed to withstand a voltage of 300, alternating current, without injury or appreciable leakage. These are hermetically sealed in a metal box. The "New Form" condenser is fitted into a polished quarter sawed oak case. This makes a very attractive appearing instrument, which may be installed by simply mounting it upon a wall, and rearranging the cords on the exposed binding posts in accordance with the directions which accompany the instrument. That this process is very simple may be seen by the illustration, from which an idea of the entire labor necessary for its installation may be gained. The manufacturers state that these condensers have been widely used, and have given great satisfaction. They will be pleased to furnish further information and prices to all persons who wish to learn more about the uses of condensers.

Only a Screwdriver is Needed to Install the Andrae Condenser.



It is Mounted on Wall Beside the Telephone.

Connection is Made by Rearranging Cords.



A Brief Test and the Work is Done.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., which has moved into its new factory, reports that its business is each day showing a substantial increase. The new structure contains about 200,000 square feet of floor space, which is devoted to the exclusive manufacture of telephone apparatus. Telephone men visiting Chicago are invited to call on the company and see for themselves the actual process of manufacturing telephone apparatus.

FRANK B. COOK announces that he has received the approval of the National Board of Fire Underwriters on his Type B-4 Subscribers' Station Protector. The Type B-4 protector is equipped with Cook's new tubular fuses, with improved carbon lighting arresters, and with sensitive heat coils. All parts are mounted on a heavy porcelain base. It is claimed that the new tubular fuse does not explode, does not give a flash, and does not continue the arc when blown. These fuses protect against heavy currents. The carbon lightning arrester is provided with a perforated celluloid dialectric, in which the perforations are so small and so numerous that the discharge is greatly broken up, and is forced to pass through the arrester at many points. This is designed to prevent particles of carbon from breaking off and short-circuiting the arrester. If an arc continues through the arrester, due to a cross with a high voltage circuit, the celluloids will melt and allow the springs to press the carbon blocks together and form a dead ground through the arrester. This stops the arc, after which, if the current increases sufficiently, the tubular fuse will blow and entirely cut out the instrument from the circuit. Sensitive heat coils are provided for protection against sneak currents.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, St. Louis, Mo., has issued the third in the series of monthly pictorial calender cards. These cards have met with great popularity on account of their useful and artistic qualities. The company em-

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One Minute, Mr. Manager

before you order your next lot of telephones, just take a post card. Write on it your name and address and simply say, "We are in the market for telephones." That's all. It won't take you a minute, but it will bring you convincing facts why our "New Beauty" instrument is the telephone of telephones.

EWING-MERKLE ELECTRIC COMPANY

St. Louis, Mo., U. S. A.

THE BIG HIT
OF THE
ELECTRICAL SHOW

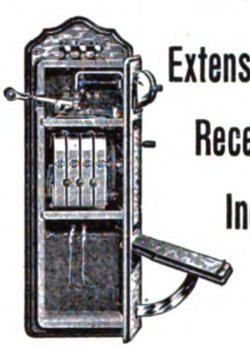
R·I BAT

ROCK ISLAND
NEW PATENT
DRY CELLS

ROCK ISLAND BATTERY CO.
CINCINNATI, OHIO

HEADQUARTERS
FOR
Telephone Supplies

Magnetos
Generators
Ringers
Batteries



Extension Bells
Receivers
Induction
Coils, Etc.

The largest stock in the country ready for immediate shipment. Our monogram is on each —denoting the highest grade procurable.
Bulletin 200 shows the assortment.

The Holtzer-Cabot Electric Co.
395 DEARBORN STREET, CHICAGO.
FACTORY: BROOKLINE, MASS.

THE VALUE OF A MEASURING INSTRUMENT

Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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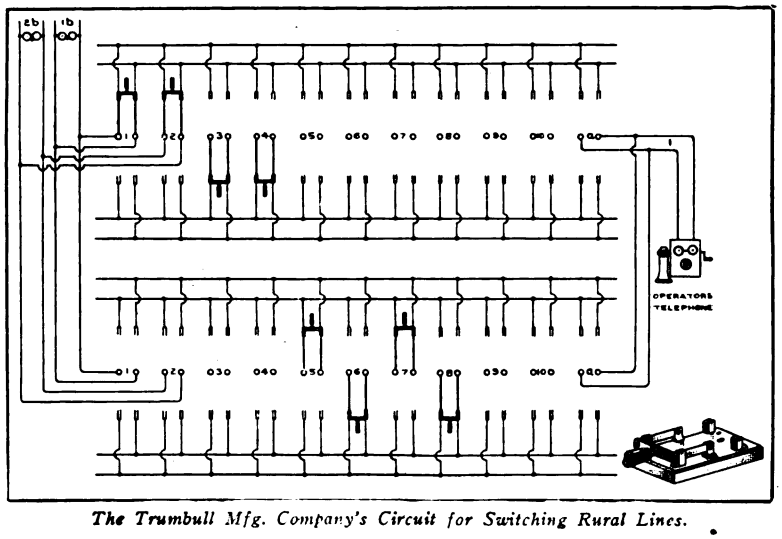
ploys them to introduce its product to the trade, and this month calls attention to its ability to make quick shipments. Parties interested can have their names places on the mailing list by addressing the company.

SWITCHING CIRCUITS FOR RURAL SYSTEMS.

ONE of the first subjects that comes up for discussion after a telephone company is organized is "How large a switchboard shall we install?" If the company is going to operate in a rural district, the number of subscribers that can be secured is very indeterminate; it may be five or one hundred. If a board having only a sufficient capacity to handle the former number is installed and more people want service, then it is necessary to add another board or else discard the one in use and put in one of sufficient capacity. With a small company this is an expensive proposition. A method submitted by the Trumbull Electric Manufacturing Company, Plainville, Conn., is herewith described. While extremely simple in operation, it is nevertheless claimed by the manufacturers to answer the same purpose as a small switchboard. Its principal feature is the use of Trumbull double throw knife switches.



The Trumbull Mfg. Company's Circuit for Switching Rural Lines.

In the illustration, ten lines are shown connecting to twenty switches in such a way that four parties can be talking to four others without interference. The lines are connected to the knife blades of the switches, two switches being wired to each line in multiple. The spring contacts on each end are connected to a pair of wires so that the corresponding contacts for all the switches in one row are wired in multiple. An operator's listening telephone is connected to the end switch, marked *a*, of each line. To simplify the illustration, only two lines are shown. Supposing station 1 desires a connection. He will signal the exchange by means of the extension bell 1 b. The operator will then throw one of the switches connected to the line on which the call is received into contact with one set of end springs, then by throwing the switch of the operating telephone in the same bank in the same direction, he will be able to talk to the calling party over the connecting wires. Now, if station 2 is wanted, the operator will throw the switch for line 2, which is in the same bank with the switch first operated into contact, with a set of springs connected to the connecting or bridge wires not in use, connect his instrument to the same side and ring. When the party answers, he will open his switch and throw the switch of line 1 completely over, connecting lines 1 and 2 to the same multiple leads. Disconnection signals are received over the extension bells.

This, it will be seen, is a very simple arrangement which can be easily constructed by any one. The manufacturers claim that it is extremely economical, as there is no expense for cabinet, plugs, cords, etc. New switches may be installed by any one as they are needed. In the matter of repairs, there are no difficult adjustments to be made, and in fact, as there is no delicate apparatus used, there is nothing to get out of adjustment, or wear out.

At the time when greater facilities are required on account of the growth of the exchange, and a switchboard is installed, the switches will be found useful at subscribers' stations to open and ground lines during storms and around the exchange for various uses. The Trumbull switches are said to be particularly adapted to this work on account of their construction, which always insures clear and positive contacts.

SPECIAL BUSINESS STATIONERY.

THE stationery and forms which are used by telephone companies for purposes which make it necessary for them to be seen by persons not closely connected with the management must be not only correctly designed from business, and legal standpoints, but must be attractive in appearance. The Edwards-Hine Company, 5 and 7 Pearl street, Grand Rapids, Mich., has devoted considerable attention to paper of this class, and has produced some forms which are claimed to be admirably suited to the purposes for which they are designed. Amongst these forms may be mentioned bonds, stock certificates, vouchers, letter heads, etc.

On these forms the company has printed, by a lithograph process, special designs. The sheets are made up in very large quantities, and, upon receipt of an order it only remains to print the name of the company which is to use the forms in the space reserved for that purpose. In this way the Edwards-Hine Company is able to supply papers for various purposes upon short notice. It states, also, that as it does not have to make up a design and have cuts made, etc., for each order its prices are much lower than can be obtained by managers who have a special design made, and are obliged to pay for printer's material for a single line of work.

The various forms which are issued to the public are printed with an attractive design, which makes prominent use of the Independent shield, thus securing the full advertising value of the emblem. Stock certificates, bonds, etc., are arranged to properly comply with the laws governing the forms of these papers. The company also has a special line of forms for construction blanks, distribution of material, etc., which have been designed after a wide study of proper methods. The company states that these forms have been in use for a considerable time by many well conducted telephone companies, and have given much satisfaction. It will be pleased to give further information upon receipt of requests.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has designed an attractive celluloid instruction card, for attachment to the face plates of transmitters. On it is printed "Use this 'phone for long distance" and the Independent emblem. The lettering is printed in blue and the shield in red, white and blue. For Independent companies which are anxious to keep a reminder before their subscribers who have two telephones, it is very useful. A sample will be sent without charge to interested persons.

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WE ISSUE A BOOKLET

It Tells Why She Can't Hear a Word

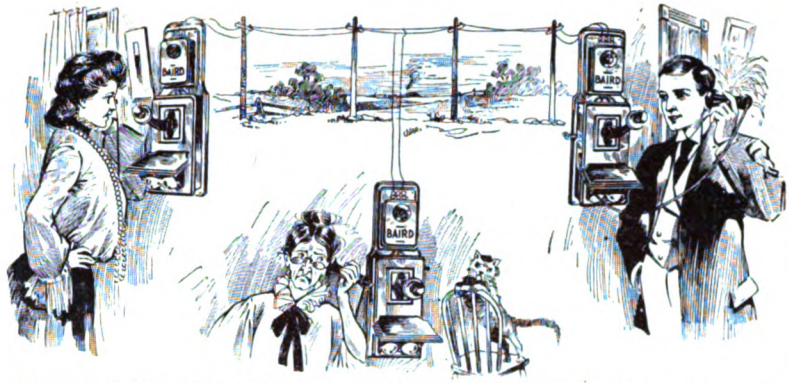
and how

THE BAIRD SECRET SERVICE

prevents it.

BAIRD MANUFACTURING CO., CHICAGO

No. 6 Michigan Street



THE RUBBERING DAYS ARE OVER—SHE CAN'T HEAR A WORD

BUYING TELEPHONES IS A SERIOUS BUSINESS

Most every manufacturer has some particular feature which he extols, and the consequence is that the buyer is at sea unless he is well versed in the why and wherefore.

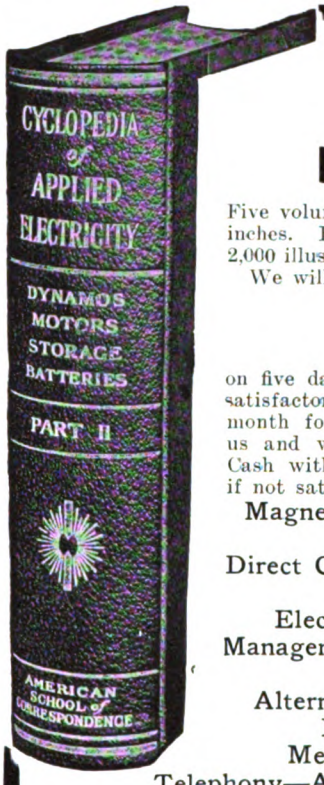
Now we make a telephone that differs from most others in that no part is better or worse than any other. It is good all the way through. Of what use is a loud talking transmitter if the receiver is weak, or a powerful generator if the ringer only tinkles? No use at all. Columbia telephones are the ones you should buy because they can hold up their end with the best of all others, and will be giving service when the so-called telephones of quality are in the scrap heap.

Just drop us a line to show you are interested and we'll tell you some things worth knowing.

THE EDISON TELEPHONE CO.

60-68 West Van Buren Street

CHICAGO, ILL.



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Applied Electricity

Five volumes, 2500 pages, size of page 8x10 inches. Bound in ¾ Red Morocco. Over 2,000 illustrations.

We will send the entire **Five Volumes**

FREE

on five days' approval, express prepaid. If satisfactory, send $1.00 down and $2.00 per month for nine months; otherwise notify us and we will transfer the books free. Cash with order, $18.00. Money refunded if not satisfactory.

Magnetism—Wireless Telegraph
Telautograph
Direct Current Dynamos & Motors
Storage Batteries
Electric Lighting, Railways
Management of Dynamos & Motors
Power Stations
Alternating Current Machinery
Power Transmission
Mercury Vapor Converter
Telephony—Automatic Telephone
Wireless Telephony

American School of Correspondence

CHICAGO, ILLINOIS

Mention Am. Tel. Journal.

Insulated Electrical Wires and Cables

ROEBLING

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

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NEW YORK **CHICAGO** **CLEVELAND**
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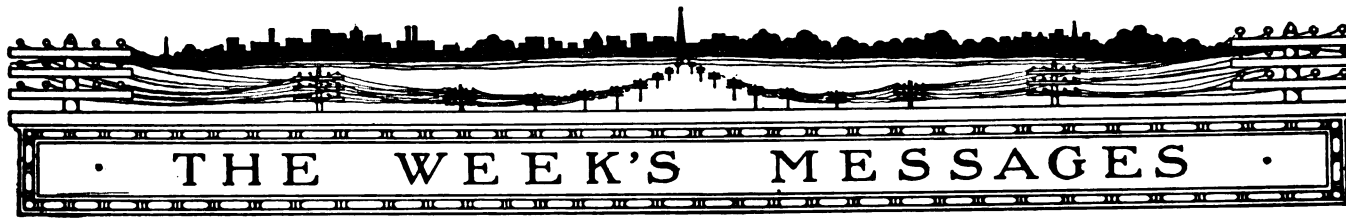

FINANCIAL.

WINDSOR, ILL.—The Windsor Telephone Company has increased its capital stock from $2,500 to $5,000.

STENDAL, IND.—The Stendal Telephone Company has increased its capital stock from $1,000 to $25,000.

HOMER, MICH.—The Homer Telephone Company has increased its capital stock from $15,000 to $30,000.

MINNEAPOLIS, MINN.—The Tri-State Telephone & Telegraph Company has declared its eleventh quarterly dividend at the rate of 6 per cent. per annum on the preferred capital stock.

PIKE, N. Y.—The Pike Telephone Company is contemplating increasing its capital stock to $10,000.

SHELBY, O.—The Shelby Telephone Company has increased its capital stock from $60,000 to $75,000.

WILLOW, OKLA.—The Willow Telephone Company has increased its capital stock from $1,000 to $10,000.

SHERMAN, TEXAS.—The North Texas Telephone Company has increased its capital stock from $10,000 to $20,000.

FRANCHISES.

MT. CARROLL, ILL.—The Mt. Carroll Telephone Company has applied for a franchise to construct telephone lines in and about Mt. Carroll.

EVANSVILLE, IND.—Clifford Arrick, of Indianapolis, has applied for a franchise for an Independent company at Evansville.

OAKLAND CITY, IND.—A twenty-five year franchise has been granted to Charles F. Stevens to operate a telephone exchange at Oakland City to compete with the Cumberland Company.

CORNISH, I. T.—The Chickasaw Telephone Company, of Chickasaw, I. T., has been granted a telephone franchise at Cornish.

ST. CLOUD, MINN.—The Tri-State Telephone Company, of Minneapolis, is endeavoring to obtain a franchise at St. Cloud.

ANACONDA, MONT.—Frank H. Stow, of Portland, has applied for a telephone franchise at Anaconda.

STILLWATER, OKLA.—The Fairview Telephone Company, of Fairview, Okla., has been granted a franchise at Stillwater.

IRENE, TEXAS.—Thomas Kay, of Hillsboro, Texas, has been granted a franchise to construct a telephone system at Irene.

TUMWATER, WASH.—The Tumwater-Black Lake Suburban Telephone Company has been granted a telephone franchise at Tumwater.

COMBINATIONS.

MORVEN, N. C.—The Wadesboro Telephone Company has sold the Morven Telephone Exchange to W. E. Pennington, of McFarlan. Mr. Pennington also owns the McFarlan exchange and the line from Wadesboro to Cheraw.

DU QUOIN, ILL.—The DuQuoin, the Anna, the Marion and the Carbondale telephone companies have passed into the possession of the Mississippi Telephone Company of Carbondale.

ELECTIONS.

HERRIN, ILL.—The Herrin-Cartersville Telephone Company has elected the following officers: Thomas M. Logan, of Murphysboro, president; Alex. Thompson, of Cartersville, vice-president; Thomas M. Logan, treasurer; Alexander Thompson, secretary.

MASCOUTAH, ILL.—The Lookingglass Prairie Telephone Company has elected the following directors: H. V. Liebig, G. F. Wombacher, Philip Mann, George Richter and Otto Rumer.

STOCKBRIDGE, MICH.—The Munith-Stockbridge Farmers' Telephone Company has elected the following officers: Emanuel Hawley, president; W. T. Willmore, secretary; William Fink, treasurer.

BRANCHPORT, N. Y.—The Keuka Park & Branchport Telephone Company has elected the following officers: President, James H. Pepper; vice-president, E. Ben Knight; secretary and treasurer, Fred Culver.

CLINTON, N. Y.—The Clinton Home Telephone Company has elected the following officers: President, G. J. Cauldwell, Clinton; vice-president, George R. Fuller, Rochester; treasurer, C. H. Poole, Utica; secretary, G. A. Jackson, Utica; engineer, D. A. Cline, Utica.

SAVANNAH, N. Y.—The Savannah Telephone Company has elected the following officers: President, E. S. Wood; vice-president, E. P. Brown; secretary and treasurer, C. A. Coleman.

TOWANDA, N. Y.—At a recent meeting at Towanda the Bradford County Telephone Company elected the following officers: President, C. L. Tracy; vice-president, Ed. Davis; secretary and treasurer, E. M. Yarnall.

VAUGHNSVILLE, O.—The Local Telephone Company has elected the following officers: President, David Jones; vice-president, J. W. Edwards; secretary, D. L. Williams, Jr.

WALWORTH, WIS.—The Walworth Telephone Exchange Company has elected the following officers: President, H. S. Bell; J. Higbee, vice-president; W. C. Davis, secretary and treasurer.

NEW COMPANIES.

FORMOSA, KAN.—The Formosa Mutual Telephone Company has been incorporated with a capital stock of $7,500.

LOUISVILLE, KY.—The General Telephone Company has been organized to take over the Independent Long Distance and all smaller companies in Owensboro, Lexington, Maysville, Paris, Eminence and other points.

LIVERMORE FALLS, ME.—The Maine Telephone & Telegraph Company, Livermore Falls, has been incorporated with a capital stock of $25,000.

SAUK CENTER, MINN.—The Sauk Valley Telephone Company, Sauk Center, has been organized. The company is to construct thirty-five miles of line.

EAST SPRINGFIELD, N. Y.—The East Springfield Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are Henry Rathbun, of Cooperstown; S. A. Young, H. W. Young and O. R. Young, of East Springfield.

LAPEER, N. Y.—The Lapeer Telephone Company has been organized with a capital stock of $2,000. The company will build a line from Lapeer to connect with the Killawod line and with the Dryden system.

NEW YORK, N. Y.—The Philippine Railway Construction Company, which is to build telephone lines in the Philippines, has been incorporated with a capital stock of $1,000,000. The incorporators are A. C. Wall, 1 Exchange place, Jersey City; E. B. Bruce and J. P. Carter, 52 William street, New York City.

PINGREE, N. D.—The Pingree Telephone Company, Pingree, N. D., has been incorporated with a capital stock of $50,000. Incorporators: James Price, Thomas Price, Oscar Boyd, O. H. Dahl, H. M. Dahl, Pingree, S. D.

RUSSELL, N. D.—The Russell Telephone Company, of Russell, has been incorporated with a capital stock of $5,000. Incorporators: A. J. Buchholz, M. A. Corey, Deep River, N. D.; John F. McKnight, A. D. Medhurst, J. K. Laporte, Russell, N. D.; E. V. McKnight, Sheldon, N. D.

FORT SENECA, O.—The Farmers' Mutual Telephone Company, of Fort Seneca, has been organized. George Gares, of Leipsic, is one of the incorporators.

LYONS, O.—The Lyons Mutual Telephone Company, Lyons, has been incorporated with the following incorporators: Frank Denson, S. Green, D. S. Knight, C. W. Carrel and others.

NEW WASHINGTON, O.—An Independent telephone company has been formed at New Washington, O., with the following officers: President, Henry Geissman; secretary, C. A. Hathaway.

NORTH STAR, O.—The North Star Telephone Company has been incorporated with a capital stock of $20,000. Incorporators: J. D. Hartzell, L. J. George, W. A. Roll and others.

SARDINIA, O.—The People's Telephone Company has been incorporated

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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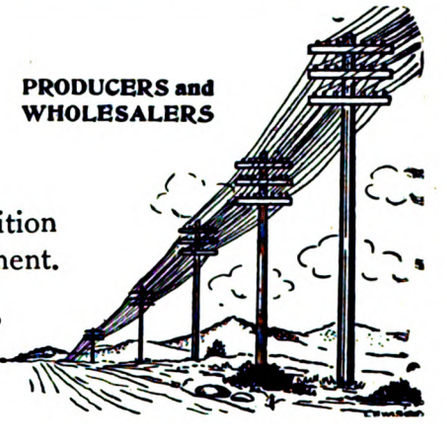

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THE WEEK'S MESSAGES

with a capital stock of $5,000. Incorporators: G. U. Kennedy, F. H. Slaughter, C. W. Frazier, M. E. Campbell and others.

OKLAHOMA CITY, OKLA.—The Southside Telephone Company, of Oklahoma, has been incorporated with a capital stock of $3,000. The following are the directors of the company: A. Spencer, Ed. Goodwin, Hugh Miller and C. F. Williams.

RICHLAND, ORE.—The Eagle Telephone Company, with main offices at Richland, has been incorporated with a capital stock of $840. The incorporators are E. A. Whittier, W. L. Gover and F. G. Jasper.

SALEM, ORE.—The Sunnyside Mutual Telephone Company has been incorporated with a capital stock of $1,500. The incorporators are A. L. West, L. M. Crozer and H. S. Poisal.

COGAN HOUSE, PA.—The Cogan House Telephone Company has been incorporated with a capital stock of $5,000.

MEADVILLE, PA.—The Eastern Crawford Telephone Company has been incorporated with a capital stock of $15,000. The officers of the company are: President, J. R. Andrews; vice-president, W. J. Maddox; secretary, H. M. Dickson; treasurer, C. S. Burwell and general manager John H. Wright.

ARMENIA, S. D.—The Chester Telephone Company has been incorporated with the following incorporators: Gus Fuhlendorf, Henry Bussell and Frank Grosbeck. The company will built a line from Armour to Platte.

CANOVA, S. D.—The Vermillion Telephone Company, with headquarters at Canova, has been incorporated with a capital stock of $500. The incorporators are W. T. Gough, C. W. Harter, Nels Graknberg and others.

WHITE LAKE, S. D.—An Independent telephone company has been formed at White Lake, S. D., with the following officers: President, J. H. Dunbar; vice-president, John Schlaeder; secretary, M. E. Williams; treasurer, Fred Steffen.

CHARLOTTE, TENN.—The Charlotte Telephone Company has been incorporated with a capital stock of $1,500.

GRANGER, WASH.—A Farmers Independent line has been organized at Granger. W. G. Hubbard is president, Barney Morrison vice-president, and Jerome Beard, secretary.

ETTRICK, WIS.—The Ettrick Telephone Company has been incorporated with a capital stock of $8,000. Incorporators: F. A. Knutson, H. O. Syvesson, A. J. Hodgen, H. C. Erickson and A. M. Hilleckson.

LOYAL, WIS.—The York Center Telephone Company has been incorporated with a capital stock of $1,000. Incorporators: W. J. Bush, C. H. Brown and H. H. Christofferson.

PERSONAL.

WINN BOSLOW, who has been connected with the construction department of the Interstate Telephone Company for the past six years, has accepted the position of manager of the construction department of the Streator Telephone Company at Streator, Ill.

RALPH D. CLEARWATER has been made district manager for Kingston, N. Y., by the Hudson River Telephone Company.

CHARLES H. COAR has resigned his position with the Northwestern Telephone Company to accept a position with the Twin City Telephone Company in its engineering department. Mr. Coar was recently appointed a member of the Minnesota State Board of Electrical Examiners by Governor Johnson.

EDWARD FOLEY has been promoted to the superintendency of the Hudson River Telephone Company's plant in the district including Troy, Watervliet, Cohoes, Waterford and Mechanicsville, with headquarters at Troy.

E. H. GREENLEAF, formerly at Kingston, N. Y., has been promoted to the management of the Newburg exchange of the Hudson River Telephone Company.

DUDLEY ROLLAND has been appointed manager for Linn and Benton Counties, Oregon, by the Pacific States Telephone Company.

P. L. LAVALLE has been made assistant manager of the Chicago Telephone Company's exchange at Geneva, Ill.

C. C. LEWIS has been transferred from Fremont to assume the management of the Central Union exchange at Delaware, O.

G. C. RIVELER has recently taken charge of the Port Huron exchange of the Michigan State Telephone Company.

C. E. ROWE, who has been manager of the Michigan State Telephone Company's exchange at Port Huron, has been made a special representative of the company with headquarters at Detroit.

MISCELLANEOUS.

INDIANAPOLIS, IND.—The Southern Indiana Railway will install a simplex telegraph and telephone line. It is said that the train dispatching will be done chiefly by the telephone.

MARINGOUIN, LA.—John M. Wilson will install a telephone system. Heretofore telephone communication with the outside was had through a single long distance box. Thirty subscribers, the necessary number for the establishment of an exchange, were secured within half an hour.

PROVIDENCE, R. I.—The New England Shaver Telephone Company has been reorganized under the name of the Heene Telephone Company, with a capital stock of $2,500,000. The company will construct and operate lines throughout the state in opposition to the Bell company.

EDMONDTON, ALBERTA, CAN.—The city is considering the installation of a municipal telephone system. For particulars address Mayor May or City Electrician Ormsby.

New Construction in the Field

LEWISTON, IDAHO.—The Lewiston-Waha Land & Irrigation Company is to build a private telephone line about thirty miles in length.

ALTON, ILL.—The Star Telephone Company, which has recently increased its capital stock from $5,000 to $25,000, is to make many important improvements in its system.

GREEN RIVER, ILL.—The Green River Telephone Company expects to make many improvements in its system.

HAGERSTOWN, IND.—Among other improvements to its system, the Cambridge City Telephone Company is to string about 2,000 feet of additional cable.

INDIANAPOLIS, IND.—The New Long Distance Telephone Company, of Indianapolis, Ind., is to build new lines to South Bend. It will also build trunk lines to Ft. Wayne, Louisville and Richmond.

NORTH LIBERTY, IA.—The North Liberty Telephone Company contemplates many improvements in its system.

LIVINGSTON, MICH.—The Livingston Mutual Telephone Company is building a line to Hartland, also to Parshallville.

MONETT, MO.—The Farmers' Mutual Telephone Company, now operating in the towns of Mt. Vernon, Aurora and Verona, is to build a line to Monett.

BEATRICE, NEB.—The Home Telephone Company is building a line to Wymore.

DEMING, N. M.—The Luna County Telephone Company is extending its lines from Deming to Faywood Hot Springs and to the Mimbres Hot Springs.

CALEDONIA, N. Y.—The Livingston County Telephone Company is installing an exchange at Caledonia.

CAMDEN, N. Y.—The Camden Home Telephone Company is building a line to Florence, also one to Hillsboro.

ITHACA, N. Y.—The Ithaca Telephone Company is to lay about 7,000 feet of conduit.

MARIETTA, O.—The Marietta Telephone Company is to spend about $50,000 in improving its system.

ALTOONA, PA.—The United Telephone & Telegraph Company, of Harrisburg, Pa., is to build a line from Altoona to Bedford.

CENTER MORELAND, PA.—The Commonwealth Telephone Company, with lines between Center Moreland and Lockville, is to extend its system.

LANDS' STORE, PA.—The Mountain Telephone Company is to build a line from Lands' Store to Fredericksville.

LOYALSOCK, PA.—The Loyalsock Telephone Company is to build lines to Lower Fairfield Township and to Proctor.

ST. MATTHEWS, S. C.—The Orangeburg & St. Matthews Telephone Company, which has recently increased its capital stock to $6,000, is to greatly improve its lines, and give St. Matthews an up-to-date local exchange.

ADAMSVILLE, TENN.—The Stantonville Telephone Company, of Stantonville, is building a line from Adamsville to Enville.

DALLAS, TEXAS.—The Southwestern Telephone & Telegraph Company is to spend $150,000 in conduit work.

DEXTER, TEXAS.—The Independent Telephone Company is building a line from Dexter to Hagerman.

SAN ANTONIO, TEXAS.—The San Antonio Telephone Company will string about 25 miles of aerial lines.

UNIONTOWN, WASH.—The Uniontown Telephone Company is to build a line to Johnson, where connections will be made with Pullman, Colfax and other towns.

WALLA WALLA, WASH.—The Ewartville Telephone Company, owned and operated by Colfax and Pullman citizens, is to build a line to Walla Walla.

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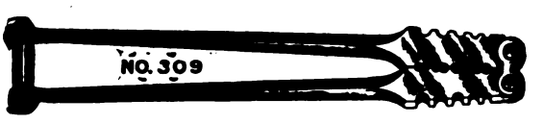

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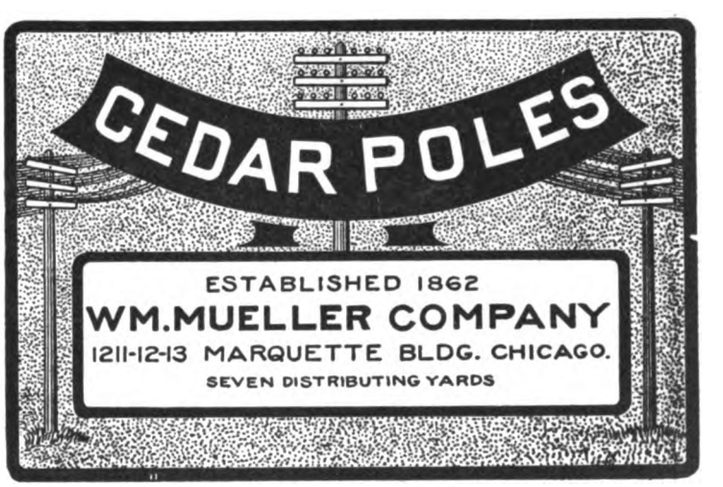

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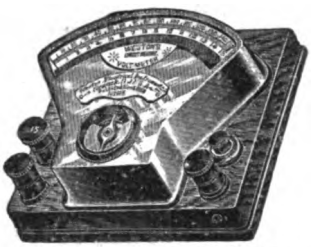
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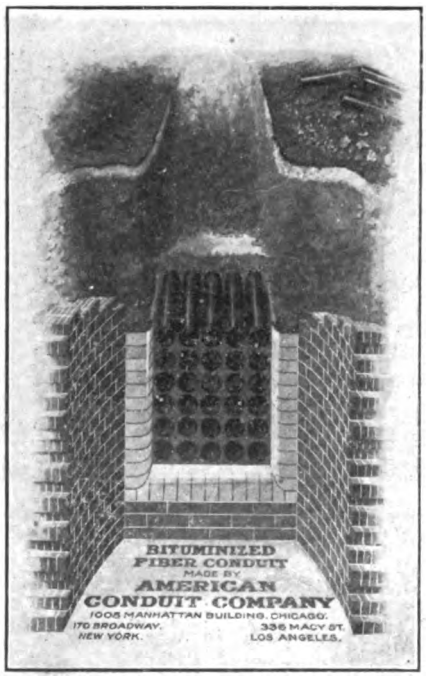

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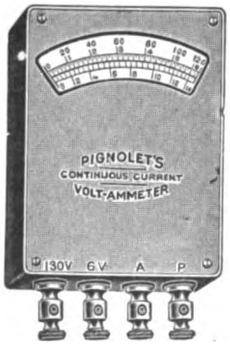

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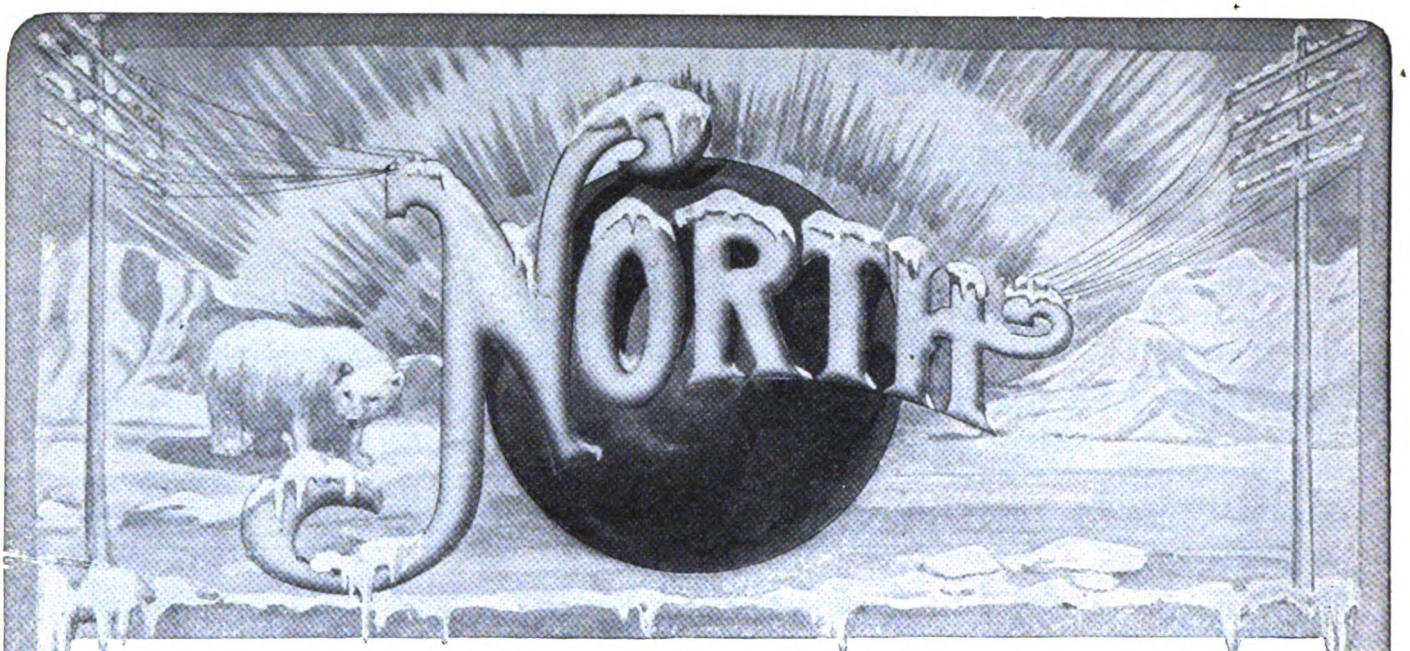

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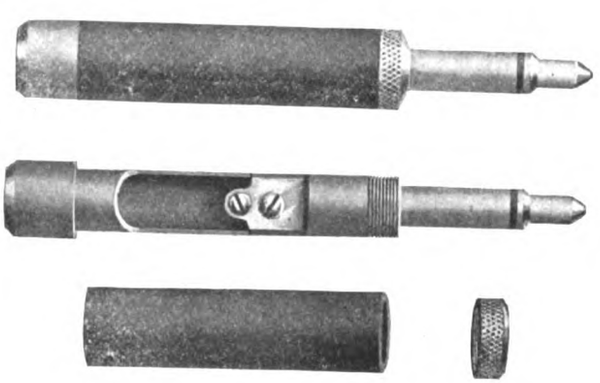

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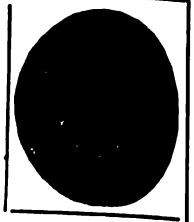
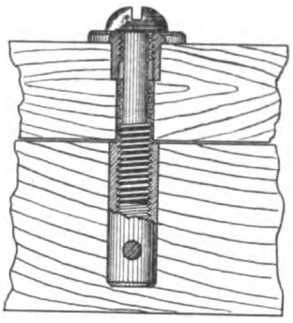
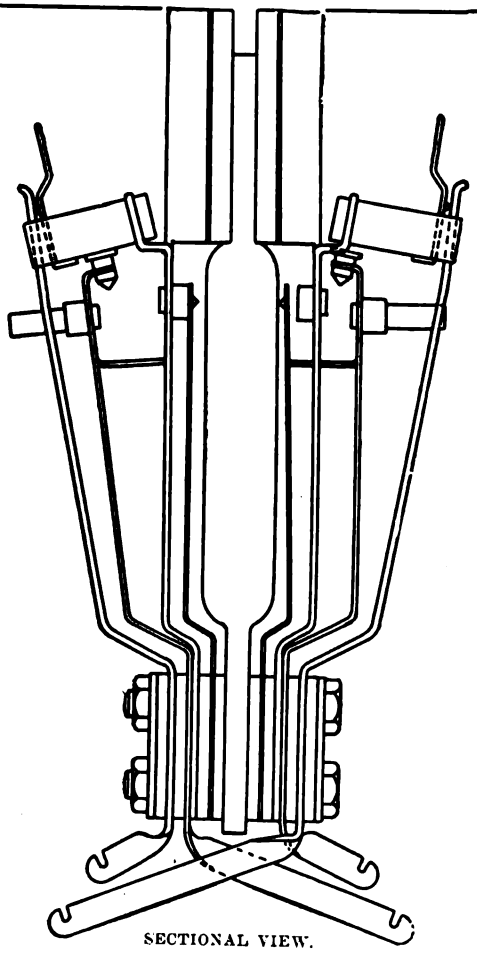
Little Things That Count



Unless otherwise ordered MONARCH TELEPHONES have a door fastening like that shown in the illustration. Two such fastenings are on each door. A machine screw passes through a bushing in the door and fastens in a slightly larger bushing in the box. The threaded portion of the screw being larger than the shank, the smaller bushing keeps the screw from falling out when loosened.



MONARCH TELEPHONE MFG. CO., - - - CHICAGO, U. S. A.



SECTIONAL VIEW.

Cook No. 14 Protector

A Well-Known, Well-tried Protector, Wonderfully Improved

TWO HUNDRED AND TWENTY THOUSAND (220,000) of these same heat coils were installed during 1904 and 1905. They are giving perfect satisfaction.

The following exchanges have installed or ordered Cook No. 14 SINCE JANUARY 1, 1906:

Syracuse, N. Y.	6,100 pairs.
San Antonio, Tex.	3,300 "
Bloomington, Ill.	1,950 "
Paris, Ill.	1,380 "
Kansas City, Mo.	1,160 "
Canandaigua, N. Y.	1,000 "
Normal, Ill.	440 "

No bolts or pieces of wire used in transposing line and switchboard terminals (see diagram). No chance of loose connections in the circuit.

When the coil operates, a split spring tightly grips the tip, and prevents its falling into the lower banks of springs.

Lots of other good points that you want to know about. Write and ask. If you're interested, we'll give you a list of engineers and exchange managers who swear by this protector.

Frank B. Cook. Mfr, 238 W. Lake St. CHICAGO, U. S. A.

Insulated Electrical Wires and Cables

ROEBLING

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

Agencies and Branches

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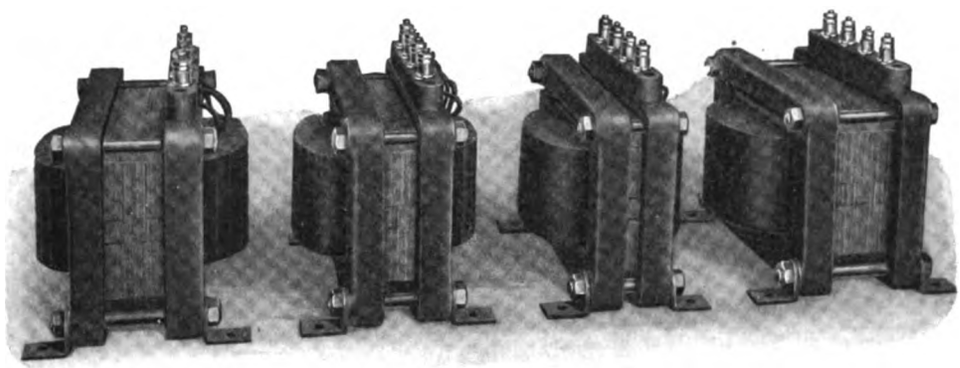
DEAN TELEPHONE APPARATUS

Unlimited Possibilities



The Harmonic Converter, together with our 4-party harmonic system, has opened up a new field in selective party line ringing which has unlimited possibilities—low first cost of ringing machines, switchboard selecting apparatus and selective ringing telephones—lowest possible cost to install—extremely low power cost to operate (lowest on record)—practically no maintenance expense—absolute and reliable results with non-interfering selective signalling.

The unlimited possibilities of the Harmonic Converter have recently given us the 8-party bridged selective system with no grounds, step by step mechanisms, biasing springs, vibrating contacts or other complications in the telephones or in the exchange apparatus. While this latter system is not ready for the market, we have proven it out in practice and exhibited it in actual operation before the American Institute of Electrical Engineers at Pittsburg, Pa., March 13, 1906.

The above illustration shows the four transformers used in our four frequency Harmonic Converter. They are built as massive and substantial as electric light and power transformers, and will stand untold abuse. Their ability to stand extremely heavy loads makes the Harmonic Converter an ideal ringing device. There is only one Harmonic Converter, that designed and built by us. It is not a delicate instrument or toy, being made for the largest and most exacting requirements.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY ——— **THE BEST IS THE CHEAPEST**

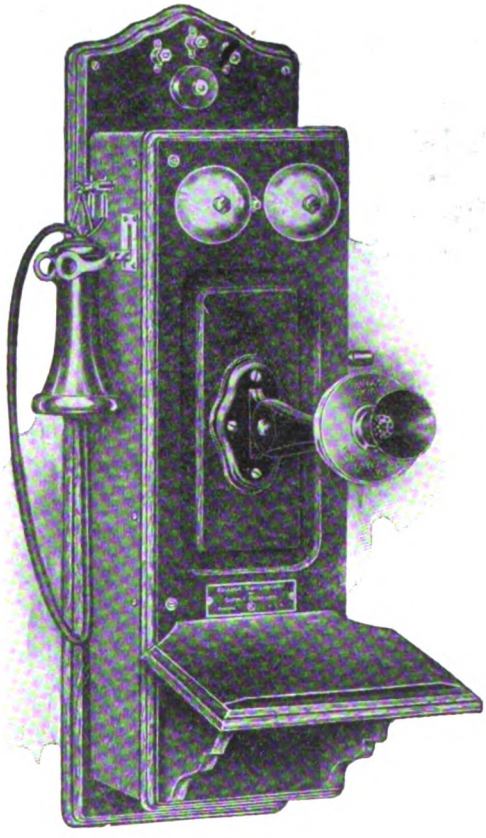
KELLOGG
BRIDGING TELEPHONES

Manufacturers of Telephone Switchboards of any size and description for common battery and magneto systems. Telephones of all kinds, Telephone and Line Supplies, Switchboard Cables, Wires, Poles, Miniature Lamps.

Highest Awards
GOLD MEDAL
Buffalo, 1901

GRAND PRIZE
St. Louis, 1904

Our telephones are built to last, and the "Kellogg" Guarantee is back of every one we sell.
Send for Folder No. 1.



FOUR GOOD SPECIALS

Set No. 1303—With Grounding Key. With this attachment you can ring the other subscribers on your line without calling the exchange. Or, you can call the exchange operator without ringing the other bells on the same line. SIMPLE—INEXPENSIVE—EFFECTIVE.

Set No. 1298—Condenser in the Secondary Circuit. Bells can be rung when all the receivers are off their hooks. Indispensable for heavily loaded lines.

Set No. 1274—Transmitter Cut-Out. Saves batteries and is a great convenience.

MADE TO ORDER—Selective 2 or 4 Party Instruments with Direct Current Generators. Enable you to call central without ringing the other parties on the line.

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES

PHILADELPHIA, PA.	CLEVELAND, OHIO	NEW YORK CITY	LOS ANGELES, CAL.
Keystone Tel. Building	Electric Building	116 Nassau Street	318 W. Second Street

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS

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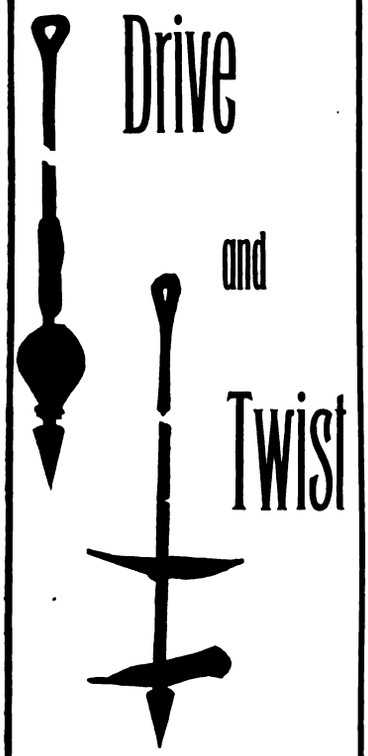

Drive and Twist

Installed in 60 Seconds

Pulls on SOLID DIRT

STRONGEST ANCHOR MANUFACTURED

Specially Designed to Replace "Dead Men"

Write for new complete catalogue

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

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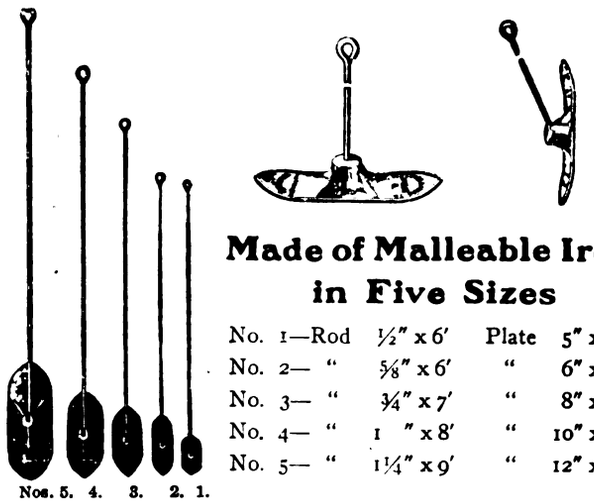

Nos. 5. 4. 3. 2. 1.

Made of Malleable Iron in Five Sizes

No. 1—Rod	½" x 6'	Plate	5" x 10"
No. 2— "	⅝" x 6'	"	6" x 15"
No. 3— "	¾" x 7'	"	8" x 18"
No. 4— "	1 " x 8'	"	10" x 22"
No. 5— "	1¼" x 9'	"	12" x 30"

We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

TOLEDO, O.

We believe that quality will win nine times out of ten

THE Penny-wise may buy cheap batteries for a time, believing they are thereby practicing economy but they will eventually realize the folly of such action. The shrewd buyer buys the best, for he knows that

Quality counts

Get a few **1900** cells and prove it for yourself

THE

Stromberg-Carlson Telephone Mfg. Co.

ROCHESTER, N. Y.

Branch Sales Office - - - Chicago, Ill.

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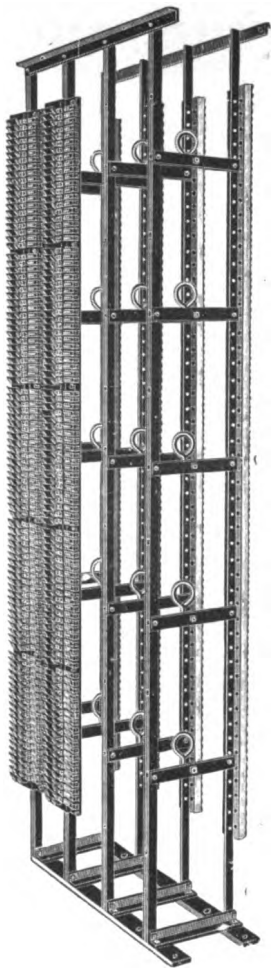
We Have It



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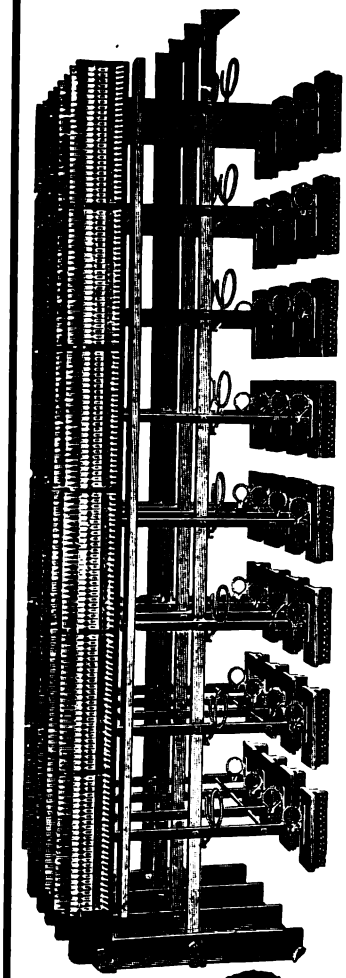
No. 237 Frame

Fuse and Carbon PROTECTION

Sterling Electric Company

La Fayette, Ind.



None Better

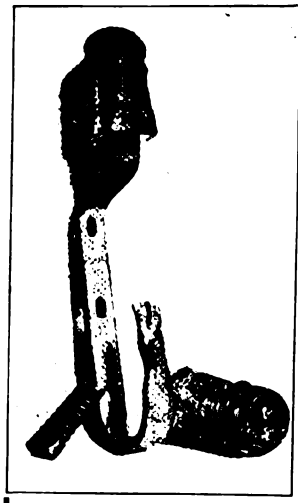
STERLING ELECTRIC COMPANY

No. 238 Frame

Heat Coil and Carbon

Sterling Electric Company

La Fayette, Ind.

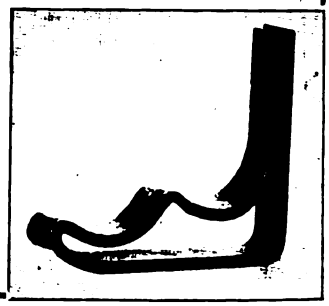


TWO "BIG" Little Things

One is the **"Hallett Universal Bracket."** It takes the place of two brackets and can be used anywhere and for any purpose such as a corner iron, wall fixture or break iron for cross-arms.

The other is the **Hallett Cable Rest** for manholes. It differs from the ordinary fixture because it can be placed where needed. Made in four sizes to support one, two, three or four cables.

Our booklet tells you all about these devices, besides many others that you need. Better write now and get quotations, as later on we shall be loaded up with orders.

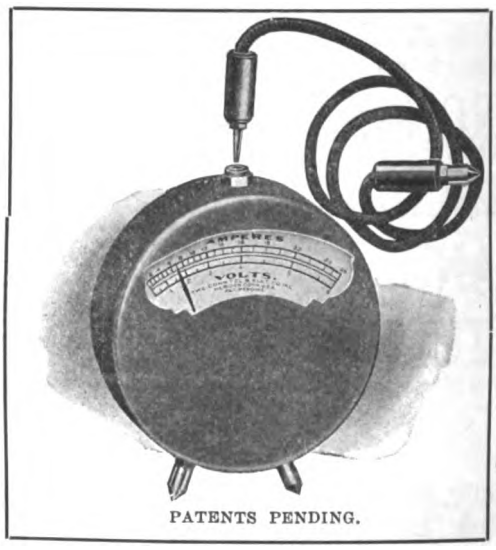


THE HALLETT IRON WORKS

92-96 WEST POLK ST.

CHICAGO, ILL.

VOLT AMMETER, $6.00.
AMMETER ONLY, $4.00.



PATENTS PENDING.

SPECIAL DISCOUNT TO THE EXCHANGE.

"CONNECTICUT" VOLT AMMETER

For testing batteries in connection with telephones, electrical instruments, automobiles, gasoline engines, etc.

ACCURATE, DURABLE, GUARANTEED!

NOTE.—If even one cell is worn out the efficiency of the others are lost. You can't locate this one without the volt ammeter.

WILL SAVE ITS COST IN A SHORT TIME.

Conn. Telephone & Electric Co.

MERIDEN, CONN., U. S. A.

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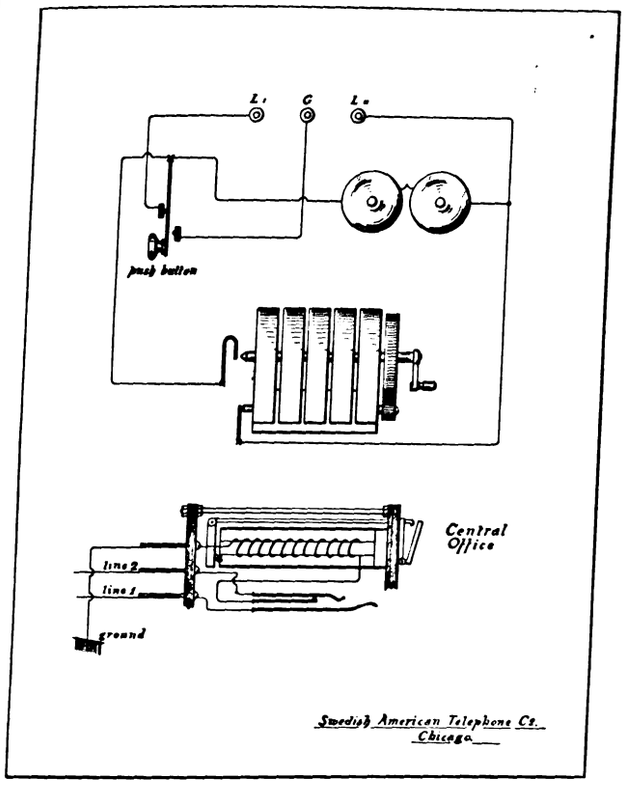

¶ By the use of circuit herewith illustrated you can call central and no other party on line can hear signal; when you call subscriber you do so without disturbing central. Central gets the signal only when you press the button.

¶ We also furnish bridging instruments for grounded lines whereby you can ring central without disturbing other subscribers on the line.

¶ All of our bridging instruments are wired for condenser, whether so equipped or not.

¶ If you have a difficult Telephone service problem let us help you out.

¶ We will gladly mail you our literature containing illustrations of our product, wiring diagrams, circuits, etc. We respectfully ask you to allow us to submit our Non-Interfering Telephone circuit proposition. It will interest you.

Swedish American Telephone Company, Chicago

AKRON, Ohio—
OAKLAND, California—
TACOMA and
BELLINGHAM, Washington

have all gone Automatic—Akron for 3,000 lines, Oakland for 5,000, Tacoma for 4,000 and Bellingham for 1,000.

Merit, absolute *merit,* was the reason why Automatic Telephone Equipment was selected by the Independent Companies in these cities.

They wanted the *best,* the *very best,* in telephone equipment.

They took their time and *looked hard* for it everywhere.

They *found it* in the Automatic.

That's where *you* will find it when you are ready to *see* it.

That's where the Independent Companies in all these cities found it—they adopted the Automatic:

Chicago, Ill.	South Bend, Ind.	Albuquerque, N. M.	Westerly, R. I.
Grand Rapids, Mich.	Aberdeen, S. D.	Traverse City, Mich.	Manchester, Ia.
Columbus, Ohio,	Miamisburg, Ohio.	Auburn, Maine.	Princeton, N. J.
Dayton, Ohio.	Los Angeles, Cal.	Fall River, Mass.	Riverside, Cal.
Lincoln, Neb.	Portland, Ore.	New Bedford, Mass.	Allentown, Pa.
Portland, Me.	Van Wert, Ohio.	Medford, Wis.	Hastings, Neb.
Auburn, N. Y.	Battle Creek, Mich.	San Diego, Cal.	Wausau, Wis.
Lewiston, Me.	Clayton, Mo.	Hopkinsville, Ky.	El Paso, Texas.
Sioux City, Ia.	Pentwater, Mich.	Hazleton, Pa.	Havana, Cuba.
Cleburne, Texas.	Toronto Junction, Canada.	Woodstock, N. B.	Marianao, Cuba.
Columbus, Ga.	Wilmington, Del.	St. Marys, Ohio.	Berlin, Germany.

AUTOMATIC ELECTRIC COMPANY
Van Buren and Morgan Streets, CHICAGO, U. S. A.

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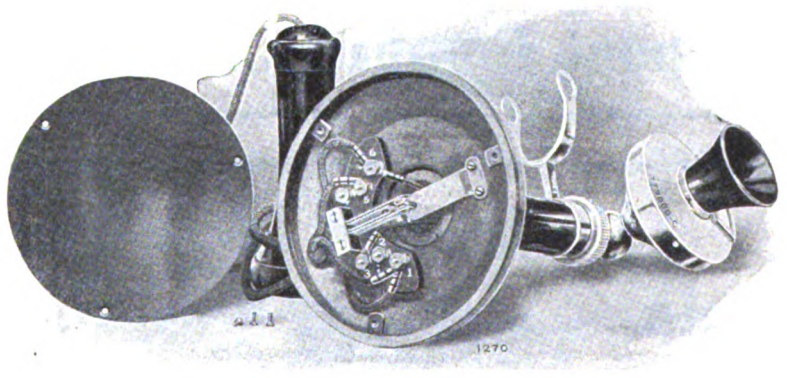
Ever Picture in Your Mind a Perfect Desk Telephone?

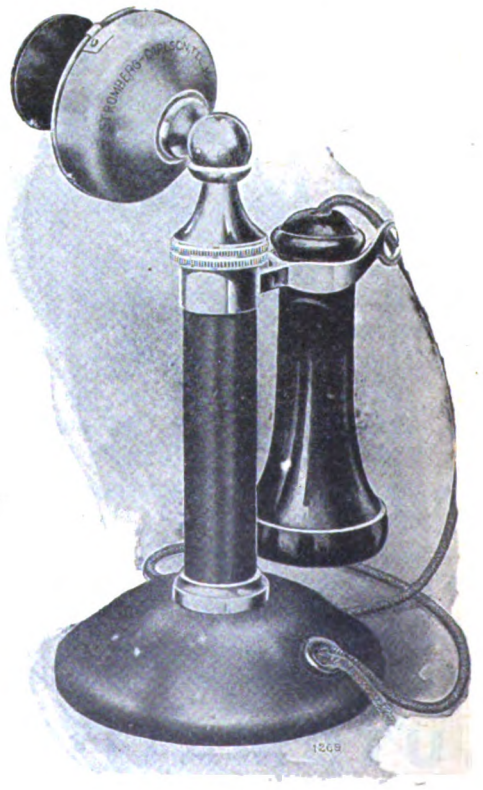
Most Telephone Men Have

Doesn't this one come the nearest to your ideal of any you ever saw before?

Could it be more attractive or simple? The finish will not show wear.

There is nothing about it to get out of order. No complicated parts.





Note arrangements of apparatus in base. The hookswitch is so simple and mounted so firmly that it couldn't get out of order.

The simplicity of that transmitter arm makes it attractive.

Better let us send you our Bulletin, describing this telephone more fully, and quote prices on your requirements.

Remember delays pay no dividends.

Stromberg-Carlson Tel. Mfg. Co.

General Offices
Rochester, N. Y.

Branch Sales Office
Chicago, Ill.

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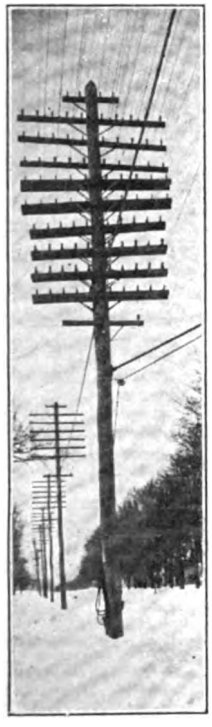
WE MAKE CABLE

Times Have Changed

IN the early days of telephony line construction was very much of a hit and miss proposition. There were no precedents to go by, and everyone built to suit his own convenience and pocketbook. Now it is different. Thanks to engineering skill and costly lessons taught by hard experience the matter of line construction has been thoroughly analyzed and definite rules have been formulated which if followed must bring success.

Past



Amongst other problems which have been solved is the one relative to cable, and now no practical up-to-date engineer would think of building heavy open-wire lines except for long-distance trunks.

Of the many advantages which cable possesses there are none greater than its factors of stability, freedom from trouble and low cost of maintenance.

March 10th we printed a letter from C. H. Judson, the well-known construction engineer. In it he gave his own experience, which emphasizes our statement that cable is the only form of construction that should be undertaken.

In the purchase of cable you should be governed by the proven ability of the manufacturer. We are

Present

COMPARE THAT WITH THIS

distributing "The Cable Booklet," which adequately describes and illustrates every process in the manufacture of Stromberg-Carlson Cable. It takes you through all departments from the receipt of the raw material to the shipping of the product and gives an excellent idea of the care and attention that is given to every detail which all go to make Stromberg-Carlson Cable standard. Will be pleased to send it to you and quote you prices. Ask for Booklet No. 79-B.

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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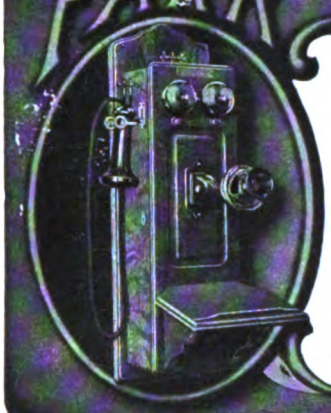
FARR LONG DISTANCE TELEPHONE FARR



WRITE US TO-DAY

We make it our business furnishing high grade magneto telephones, our goods standing in a class by themselves. None will equal them for exchange or long distance lines. Can furnish you better goods for less money than any other house. Send for catalog.

FARR TELEPHONE & CONSTRUCTION SUPPLY CO.
118-120 W. JACKSON BOULEVARD, CHICAGO, ILL.

WE ISSUE A BOOKLET

It Tells Why She Can't Hear a Word

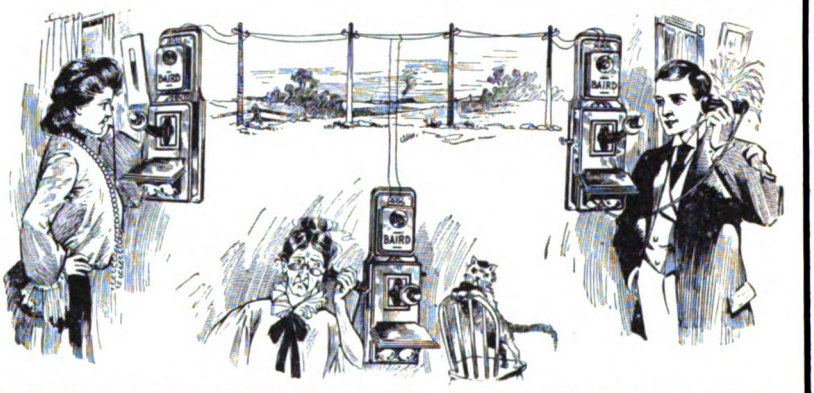
and how

THE BAIRD SECRET SERVICE

prevents it.

BAIRD MANUFACTURING CO., CHICAGO

No. 6 Michigan Street

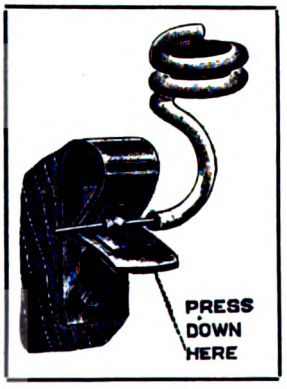


THE RUBBERING DAYS ARE OVER—SHE CAN'T HEAR A WORD

HOW LONG WILL IT BE

before you say "23" or "skiddoo" to the dealer who fills your battery order with cells equipped with the old and out-of-date screw binding post.

At best it was only a makeshift, and a very poor one at that when compared with the modern ideas embodied in the



Fahnestock Spring Binding Post

The Fahnestock Spring Binding Post is the most efficient, durable and economical device ever made: Efficient, because it holds the wire securely without any sign of injury; durable, because there is nothing about it to wear out; and economical because it makes loose or corroded contacts impossible and therefore saves maintenance charges.

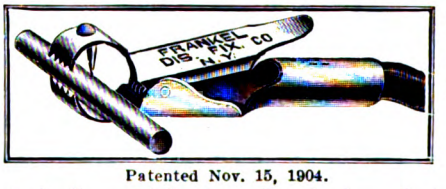
We'll send a sample free to you to look over and you can get all your batteries equipped free of cost by writing "Fahnestock post" in the order to your jobber.

FAHNESTOCK ELECTRIC COMPANY

129 Patchen Avenue, Brooklyn, N. Y.

Frankel Electric Testing Clips

Saves Baring the Wire



Dozen lots $1.50 doz.
100 lots 11c. each
500 lots 10c. each
1,000 lots 9c. each

Patented Nov. 15, 1904.

The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect connection.

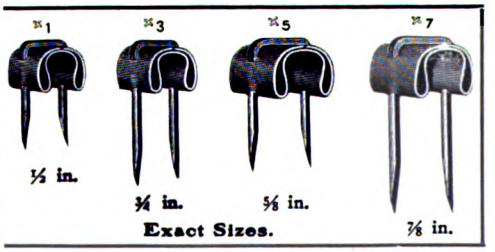
FOR SALE BY

Western Electric Company.....New York, Chicago, Philadelphia, Omaha.
Electric Appliance Company.....Chicago, Ill.; San Francisco, Cal.
Kellogg Switchboard & Supply Company .....Chicago, Illinois.
Manhattan Electric Supply Co.....New York, Chicago.
B.-R. Electric Company.....Kansas City, Mo.
Monarch Electric & Wire Co.....Chicago, Ill.

OR

FRANKEL DISPLAY FIXTURE CO., 740-742 Broadway, N.Y.

Blake Insulated Staples



Exact Sizes.

The fibre insulation gives an added protection from leaks on grounds on the wiring. When used in damp places it protects the braiding on the wire from rust or corrosion of the staple.

Manufactured and for Sale by

BLAKE SIGNAL & MFG. CO., 246 Summer Street BOSTON, MASS.

SELLING AGENTS:

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Newcomer-Manry Co., Atlanta, Ga.
American Elec. Supply Co., Chicago.
Wesco Supply Co., St. Louis.
Brooks-Follis Elec. Corpor., San Francisco.
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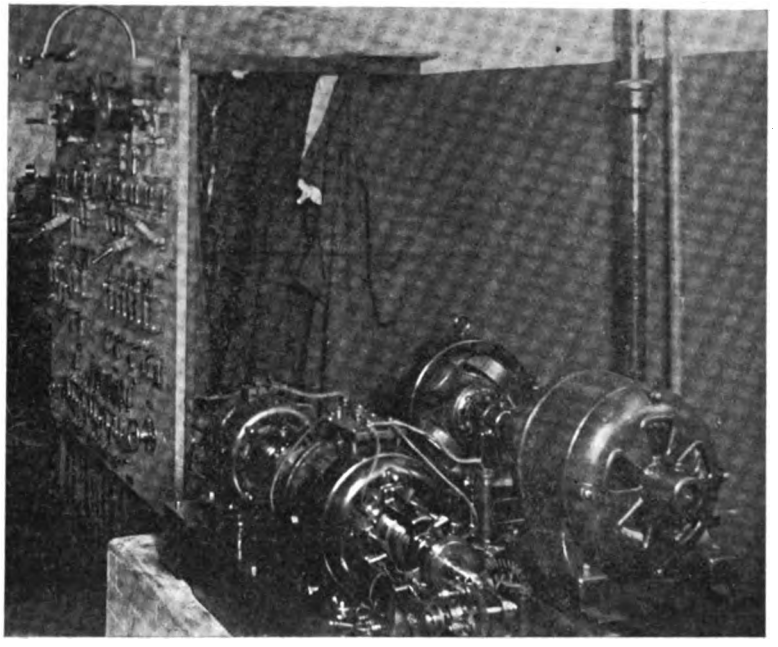
Power Data for Telephone Men*

By P. Kerr Higgins.

In order that a sufficient understanding may be obtained of the problems arising in motor work it is necessary to review briefly magnetism and electro magnetic effects. One of the essential points to be observed is that iron when acted upon, if soft, does not retain its magnetism, while steel will retain its magnetism and becomes what is known as a permanent magnet. Two poles are recognized, north and south, and are governed by the following rule: "Like poles repel, unlike poles attract each other." If a magnet is broken each piece will be a magnet and possess all of its characteristics. Another rule which applies to magnetic effects is that "Lines of force tend to set themselves parallel to each other," hence the magnetic or compass needle will always set itself so that its own lines of force will be parallel to those of the earth.

The magnetic field is the space in which the magnet has the power to affect soft iron bodies; to observe direction of magnetic field use iron filings on a sheet of paper with magnet below the paper. A piece of iron brought into the magnetic field of a strong magnet partakes of the characteristics of the magnet while under its influence. If hard it will retain them, if soft it will not. This will explain the law of attraction.



Power Switchboard and Charging Machines in the Independent Exchange at Columbus, Ga.

To obtain the full effect of both poles on another object, the magnet may be bent in the form of a horseshoe, or one set of opposite poles may be braced together, leaving the other set free for work. If such a magnet is not required at once, a keeper of soft iron should be attached to the free poles, otherwise the poles will neutralize each other and weaken the magnet. The magnet with the keeper across the poles forms what is termed a closed magnetic circuit, which is frequently used in telephony in the repeating coil, by extending and overlapping the soft iron wires of the core, so that they are always in contact. When magnetized by the passage of a current through the coil, a closed magnetic field in the core is the result and increases the efficiency of the coil.

A dynamo is a generator of electricity by artificial means, that is, by the application of power from some mechanical source it is possible to transform such power into electricity. This is not done, however, without a certain amount of loss, varying according to the style and design of the dynamo.

It is now customary to wind the armature with separate coils for each segment pair of the commutator, the end of one coil connecting with the beginning end of the next at the segment. Disks are now used instead of iron wire for the armature core, which is built up of a series of plates in order to kill the eddy currents which circulate in the armature and are a source of loss through retardation, heat, etc. This loss is termed "hysteresis."

A uniform magnetic field is absolutely necessary so as to exert a uniform pull at every point in the field of force, and this fact is constantly kept in view by designers. A distorted field will cause leakage and a consequent loss in energy, and inasmuch as the dynamo is to produce energy and this can only be done by a uniform variation of the number of lines of force cut by the armature windings, it will be seen at a glance how necessary this feature is in its design. The shape of the iron is also important and must be uniform throughout with no abrupt corners. The space also between the armature and the field must be carefully considered. This is called the gap, and should be as small as possible. In the determining of the amount of heat lost in a dynamo, it is known that heavy or large wire of great length will cause the generation of the same amount of heat as a short fine wire. The amount of heat generated is proportional to the product of the square of the current, the resistance and the time. The power consumed in watts is equal to the square of the current multiplied by the resistance. A watt is 1-746th of a horse power. The unit of electrical power is the watt and represents the power expended in an electric circuit when a current of one ampere passes through a resistance of one ohm or when the difference of potential of one volt is maintained between the terminals of a circuit having a resistance of one ohm. In an electric light circuit so far as the power is concerned, it is immaterial whether each lamp requires 110 volts and half an ampere, or 55 volts and one

*Continued from the issue of Feb. 10th.

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ampere, or 220 volts and one-fourth ampere, the result in watts is the same, as can readily be seen by a reference to the rule already given.

In the design of the commutator or collector portion of the dynamo, the current at the contact surface of the brushes must be limited to prevent undue heating. Two features should be considered, these being the minimum waste in watts due to brush defects and never to render possible undue heating of the brushes. If too high a current density exists in the brushes then heating of the brushes will be the result, even though the armature may be perfectly cool, hence a safe limit is 33.3 amperes with a maximum of 55 amperes, beyond which there is danger of loss. By using special contact brushes these figures may be increased. The losses at the brushes are usually due to two causes: friction and contact loss. The temperature usually specified is 90 de-

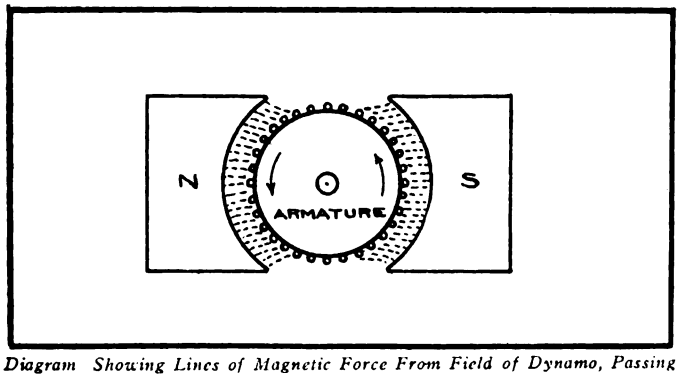


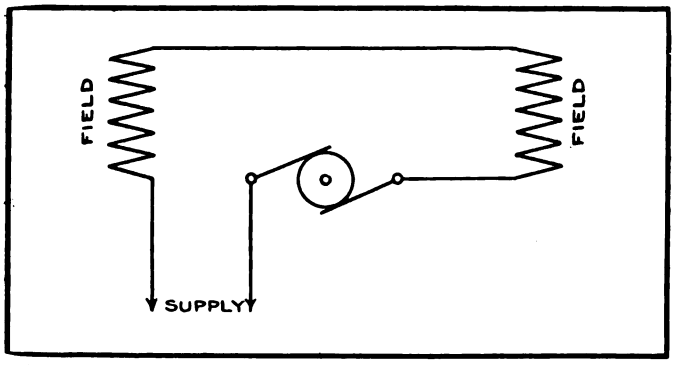
Diagram Showing Lines of Magnetic Force From Field of Dynamo, Passing Through the Armature.

grees Fahrenheit above that of the surrounding air. The best insulation for a commutator is soft mica or asbestos, both of which are not easily destroyed by heat. The waste usually permissible is two watts per square inch at a speed of 2,000 feet per minute.

The number of coils to be used is limited by the number we can get into our commutator. The pitch of the commutator bars is often set at 4-16ths inch for small machines and 5-16ths for the larger ones. Soft mica is used for insulation between the bars, as the wear of the copper and mica are nearly uniform. Otherwise the copper would wear more rapidly and the projecting ridges of mica would cause sparking. The commutator is insulated from the main shaft by mica. On account of blow holes in cast copper, rolled copper is very much to be preferred for the bars. The loss in field windings (C^2R) of shunt and series wound dynamos varies from 4.5 per cent. in a 5 kilo watt to 1.5 in a 60 kilo watt dynamo.

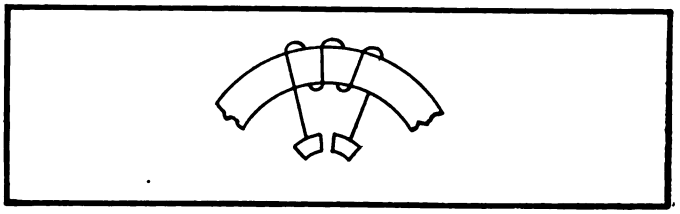
Dynamos are usually used for small electric light installations or for charging accumulators. The usual types are of three classes of construction, series, shunt wound and compound wound.

As the voltage of a dynamo at the brushes is equal to that generated less that taken up in heating the armature wires, the drop in these wires is important. An increase in current consumed means an increase in drop. The drop of a dynamo is also affected by a counter E. M. F., which



Connections Through Field and Armature of Two Pole Series Dynamo.

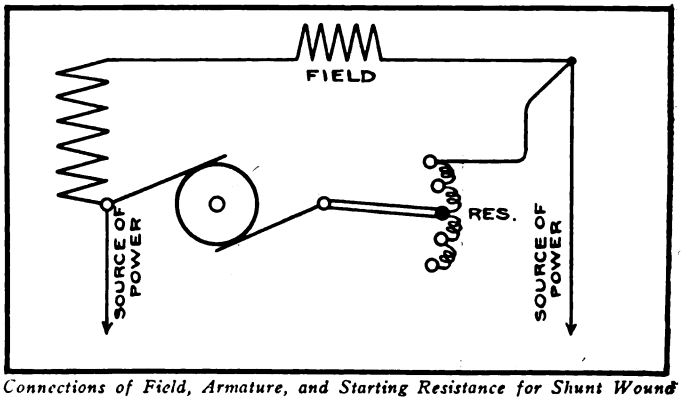
becomes stronger as the current is increased. The regulation of the field resistance compensates in some measure for this loss, but necessitates personal and constant attendance, hence the need for some automatic regulator which is found in the compound wound dynamo, being so constructed that when the two losses in



Connection of Single Armature Winding to Commutator.

the armature take place, the dynamo automatically varies the resistance in the field by sending the main current through the field coils so that as the current increases or diminishes it causes a corresponding variation in the strength of the field. Hence the dynamo will produce more voltage only when the armature produces more current. Both the shunt wound and the compound wound dynamos are used for direct current work.

A motor dynamo is the combination of a motor and a generator, electrically separate but mechanically connected by a flexible coupling and may be wound either shunt, series or compound as desired. The generator may be designed for either direct or alternating current. In telephone work the motor is usually wound for 500, 220 or 110 volts, according to the source of supply. For charging purposes the generator should give a voltage slightly above that of the battery with which it is to be used. For charging batteries direct current is necessary, for signalling ringing telephone subscribers, etc., alternating current is used. The lubrication should be by means of oil rings (automatic) and requiring attention not more than once a month. The brushes on all generators furnishing a current of low voltage and high amperage should be made of copper gauze; carbon brushes of suitable size may be used on others.



Connections of Field, Armature, and Starting Resistance for Shunt Wound Motor.

The electric motor is used for transforming electric energy into motive power for running other machinery. Like all power machines, it should be simple in construction, compact, well protected from external injury, automatic in speed regulation, durable, easily repaired, of high efficiency, free from sparking, light weight, etc.

The rule for finding the circular mils of the wire used in the coils is

$$\frac{\text{Total ampere turns} \times \text{mean length of turn.}}{1.106 \times \text{volts of coil.}}$$

An allowance of approximately 1,000 circular mils per ampere equals a current of .320 ampere for a wire, say 310 circular mils, and the amperes divided into the ampere turns will give the length in feet × length of one turn. The series motor is generally used on constant current ,constant potential circuits, such as arc lights and street railway systems; the shunt form is used on stationary work as in factories, telephone exchanges, etc.

The series wound motor is so designed that the same current is used in the field as in the armature. The current passing through the motor is equal to voltage of line—back voltage ÷ resistance in ohms of both field and armature. These motors are much in use on street cars on 500 volt systems, and their regulation is car-

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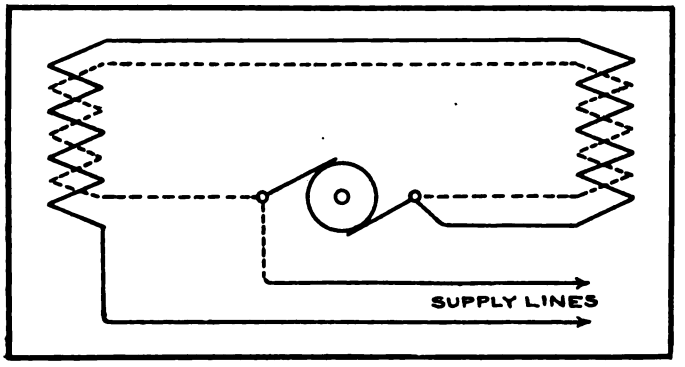
ried in by a controller in the hands of the motorman. A series motor increases its speed as its load is reduced and diminishes as the load is increased, hence manipulation of the field is necesary.



Arrangement of Windings for Compound Machine, One Field Winding in Shunt and the Other in Series With the Armature.

The shunt wound motor is something similar to its namesake, the shunt wound dynamo, hence the speed of the motor is fairly uniform under varying changes in load. The back E. M. F. is the regulator of the amount of current taken by the motor, hence the increase or decrease in the load has a similar effect on the speed of the motor. The speed is a very important thing to be considered in the design of a motor. Speed is largely a question of the relationship existing between the load, the strength of the field and the impressed voltage, hence changes or variations in these change the speed, and the motor must be designed for one or other of the two factors already mentioned. The parts of a motor entering into a question of speed are the armature and the field, and these are interdependent upon the current in each and all problems of speed are solved by a consideration of these factors. Automatic control is, of course, preferable when a constant speed is desired and resistance when a variable load is considered.

In starting a motor a rheostat is usually employed to regulate the supply of current, and in shunt motors great care should be taken to allow a short interval to elapse before the resistance is all cut out. This is necessary to allow the generation of what is known as back E. M. F., which acts as a brake, and the resistance should not be cut out even gradually until a fair speed has been established. On account of the very low resistance of the armature this precaution cannot be made too prominent, the amperage going through the machine being represented by the voltage ÷ the resistance, which in nearly every case would destroy the armature completely were the resistance not cut out very carefully. It is to be noted that high efficiency motors are in the end much more economical than those having low efficiency, in that while the prime cost is greater, the waste in energy is greatly reduced. It is poor economy to overload motors or for that matter any form of machines or accumulators for the reason that such overloading increases the depreciation of the apparatus frequently as high as 50 per cent., hence the rating of the manufacturers should be strictly adhered to.

Of late the use of circuit breakers has become general among telephone companies, and they are present on every well designed power board. They are intended to cut off the supply of current when for any reason it is over or under the proper load. The apparatus consists essentially of an electro magnet having a movable core end capable of adjustment to be attracted when a certain current passes through a surrounding helix. The contact points are of carbon, which renders the break arcless. The action is instantaneous.

All power boards are supplied with measuring instruments such as volt and ammeters, by means of which we can know the conditions existing in the circuit, from which data we can know the amount of electrical power consumed by the apparatus.

The electrical horse power is equal to the number of

$$\frac{\text{amperes} \times \text{volts}}{746}$$

Commercial efficiency can be found by dividing the horse power put in by the horse power taken out.

(To be continued.)

Telephone Engineering*

By J. J. Carty.

FROM time to time, engineering methods involving new principles are brought forth. These, when found to affect the methods of the business office, should be submitted to the business management with a full and clear statement of their bearings upon the commercial work of the company. On the other hand there are, from time to time, business proposals and commercial methods which are under consideration by the business management of telephone companies and which, apparently, are only remotely or not at all related to engineering. In view of the many unexpected and important reactions which these proposals may have upon the engineering of the telephone plant, it becomes of the first importance that they should be scrutinized carefully from an engineering point of view, unless it is conclusively apparent that they will be without effect upon the engineers' plans.

During the ten years just passed a revolution has taken place in the design and construction of telephone switchboards, the magneto switchboard having given way to the common battery switchboard. This radical change in telephone practice made new demands upon the telephone engineer, for it became necessary for him to introduce into central office construction certain elements which had heretofore been utilized principally in engineering work involving electric light and power installations.

In the magneto system, signaling from the subscriber's station to the central office was accomplished by means of a small alternating current generator turned by hand, and the current supply needed in the working of the transmitter was obtained from a few cells of primary battery located at the subscriber's station. By the introduction of the common battery system all of this was changed. The magneto generator was dispensed with as was the primary battery, the current supply for operating the transmitter, as well as that required to enable the subscriber to signal, being drawn from a large storage battery located at the central office.

In the case of a 10,000 line switchboard, the storage battery must be capable of giving an average discharge of 500 amperes; and to insure proper working conditions, it must be capable of giving a safe discharge as high as 2,000 amperes. For charging such a battery as this, suitable machines must be employed, and these must be present in duplicate or triplicate. The standard machine used for charging a battery of this type delivers 1,000 amperes.

The introduction of currents such as these, and the introduction of these machines and of a large number of auxiliary machines generating currents for special purposes, has resulted in the creation of a power plant at each central office, upon which the operation of the telephone switchboard and apparatus is wholly dependent. The introduction of these larger currents has necessitated most careful and refined methods of fusing and protecting the delicate apparatus.

While the storage batteries and auxiliary machinery employed in telephone power plants are far from equalling the magnitude of similar apparatus employed in electric light and power stations, nevertheless they have become such a vital element of the successful engineering of a telephone central office, that they require on the part of the telephone engineer a special knowledge of this branch of electrical engineering, which was formerly not requisite.

*Continued abstract from paper read before the American Institute of Electrical Engineers, Feb. 23, 1906.

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This class of apparatus must also be considered by the telephone engineer in a special manner, for not only must it be properly constructed from the electric light and power point of view, but peculiar conditions must be provided for on account of the association of this apparatus with such a delicate instrument as the telephone.

Where a dynamo is to be constructed to operate incandescent lamps, let us say, certain minute fluctuations in the potential of the machine are permissible. Were such a machine, however, to be used in connection with telephone circuits, these fluctuations in potential would be sufficient to produce such constant humming in the telephone as to render it inoperative. Hence a greater refinement of the construction of these machines in this respect is imperative where they are employed in the telephone power plant.

So it is with the storage battery, where a number of telephones are supplied by current from one storage battery; even almost infinitesimal changes in the voltage of the battery might be propagated to the telephone lines connected therewith and produce disturbances. For this reason, storage battery practice from the telephone point of view presents problems which are different from those encountered elsewhere.

One of the interesting and important developments in the modern common battery switchboards is the extensive use which has been made of incandescent lamps in signaling. The requirements of the telephone art have called for special refinement in the design and manufacture of these lamps.

While the common battery switchboards as now used in all of the large central offices represent a revolution in methods as compared with the magneto system, there are certain elements formerly used in the magneto system which have persisted. Among these is the multiple board principle. This principle consists in extending a number of lines to different points in the switchboard so that it is possible to connect with them at any one of these points. The multiple system is opposed to the transfer system, which is one wherein the lines are not so extended or multipled to different points, but proceed directly to a special location from which trunk lines extend to other parts of the switchboard, so as to provide for making the necessary connections. It is safe to say that during the past twenty years there has been no question of switchboard design that has been the occasion of so much discussion and controversy as that pertaining to the extent to which the multiple principle should be adopted.

In a self contained central office, with relatively few trunk lines extending to other offices, it is found most economical to multiple all of the subscribers' lines to each section of switchboard. In very large cities where a number of central offices are required and where the amount of trunking between the different central offices is relatively large, the advantage of multipling all of the subscribers' lines to each section is not so apparent as in the case of the self-contained office, and this fact has led many to the conclusion that for such situations multiple boards are not adapted. But this is going farther than the fact warrants, for while it is true that the advantage of multipling the subscribers' lines to all of the sections of the switchboard becomes less and less as the percentage of trunking increases, it is still a fact that the point is never reached where the multiple principle should be abandoned entirely.

The truth of this proposition may be easily established by assuming that in a large city all of the calls must be trunked and that none of them are local to the office in which they originate. In such a case as this it is obvious that nothing could be gained by extending all of the subscribers' lines before each of the operators. On the other hand, it is still essential that the outgoing trunk lines should be extended, or multipled, before all of the subscribers' operators, and all of the subscribers' lines should be multipled before the trunk operators. While the case of an office without any local calls is one which could not occur in practice, there are situations in which the amount of local calls is so small that it will not pay to multiple the subscribers' lines to all of the subscribers' operators. Just when this point is reached is a question to be determined in each case.

All materials which are permitted to form a part of the telephone plant must be carefully studied by the telephone engineer, so as to obtain, out of all those possible to use, those which offer the best combination of first cost, durability, low annual charges and high efficiency.

Considering the almost innumerable varieties of materials used, all of which must be covered by standard specifications, the work of this branch of telephone engineering, taken by itself, would require so much time to describe that I will not attempt to enter into it in any detail, except to say that it constitutes one of the important duties of the telephone engineer.

Intimately connected with this matter of the choice of material and making the specifications therefor is the complementary function of accepting or rejecting that which is offered. The drawing up of the specifications must be attended to with the utmost care so that they may be placed in the hands of the purchasing agent, and be sufficiently intelligible so that any manufacturer or person skilled in the art can understand their purpose without further information. Not only must the article desired be clearly described, but the language used must be such that no material other than that desired can be furnished. While every precaution must be adopted in the specification to exclude undesirable material, great care must be exercised that undue and excessive requirements should not be specified. Otherwise the cost of the materials would be unnecessarily increased. Here, as well as at almost every turn in the work of the telephone engineer, there is no safe side. If the specification is made too rigorous, and calls for material of a quality in excess of that which is demanded by the nature of the construction, loss will result. On the other hand, if the specification is drawn loosely or so as to admit inferior material, loss will result owing to defective working of the construction in which such materials would enter.

So far as I have gone, I have described the more typical functions of the telephone engineer. In addition to this, there are constantly arising questions demanding special investigation. The range of these questions is almost unlimited, and their adequate treatment requires most laborious and serious effort on the part of the telephone engineer. While their range is so extended as to cover almost every field of engineering in scientific progress, and while the telephone engineer cannot be expected to be expert in all departments of scientific investigation, he is required to direct such investigations, employing, as his judgment may dictate, experts in various departments to report upon those phases of the work in regard to which they may be best qualified to speak.

Thus far I have discussed the work of the telephone engineer without particularly calling attention to his relations to the telephone organization at large. This relation can best be understood by stating that the telephone engineer in every well organized telephone company must, in the first place, broadly determine all of the important features of the plant of the company, and he must in detail decide what shall be the nature of the construction and the method of operation of every single item which constitutes the physical property of the telephone company. If, through defective design, a telephone cable is found to be ineffective mechanically or electrically, it may be said in a properly organized telephone company that the fault lies with the telephone engineer. If, through defective design, the telephone switchboard is found to be unsuitable with respect to its maintenance or operation, the fault lies with the telephone engineer. So on through all of a multitude of items which constitute a telephone system. If, in a well organized and well administered telephone company, the plant is not constructed in accordance with the best state of the art, the fault lies with the telephone engineer.

NEW COMPANY FORMED TO TAKE OVER PLANTS IN KENTUCKY AND INDIANA.

SEVERAL of the more important plants in Kentucky and Indiana are to be merged in a new concern to be known as the Central Home Telephone Company. The capitalization of this company, which was organized under the laws of the State of New Jersey, is placed at $5,000,000.

Among the companies already taken over are those operating in Owensboro, Paducah and Maysville, Ky., and Bedford and Bloomington, Ind. At present the Central Home Company purposes to

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buy out from fifteen to twenty Independent companies, and with these as a nucleus to extend its operations as quickly as possible. The long distance lines will be operated in conjunction with those of the Louisville Home Company and the New Long Distance Telephone Company. The officers of the company are E. L. Barber, Wauseon, Ohio, president; Joshua D. Powers, Louisville, treasurer, and J. L. Monteith, Bloomington, Ind., secretary.

Among the Louisville capitalists associated in the company are Samuel Culbertson, James P. Helm, who is also attorney for the company; John L. Helm, Attilla Cox, J. Will Gaulbert, George Braden, Harry Weissinger, Henry Kaufman, Powhatan Wooldridge, J. B. Lewman, John J. McHenry, John Armstrong and about twenty others. A meeting of the underwriters of the company will be held in Louisville in the near future, at which time a board of directors will be elected. The general offices of the company will be in the Louisville Home Telephone building.

Canvassing for Subscribers

By R. S. Hamilton.

UNTIL within the last three or four years the importance of the solicitor was very much underrated. Inexperienced men were employed with no thought as to their qualifications, and the results of such mistakes are even at this late date appearing in some of our exchanges where uniform rates are desired. Previous to this time a particularly influential man was given a fifty and sometimes a hundred per cent. concession until there would perhaps be a dozen different rates for the same class of business. Only last fall an Independent company in one of our western states employed two solicitors in a city of 35,000 population, and told them the different rates and greatest consessions they would be allowed to offer to those especially desired. Now this company is making no end of unpleasant explanations and extremely expensive arguments with both old and new subscribers. Not only this, but the men were allowed to jump here and there in their canvass until it was impossible for any one to tell when the city had been covered, and in this way good prospects were overlooked and the same territory often covered the second time. On asking the general manager how he handled his solicitors he said:

"We leave the details entirely in their hands; the results are all we are after. I am too busy with other matters to give it my attention."

That general manager does not realize, seemingly, that those solicitors are laying the foundation for future dividends or for discord and loss of business. The most serious mistake we Independents are making to-day is in cutting of rates during an active canvass or fight. If a concession must be made the rates should not be cut, but free service may be given for a certain length of time, and at its expiration the old rate may be restored. Having once lowered the rate many of us know from experience how difficult it is to replace it, while with the temporary free service people expect no change in the rate when it is resumed.

There is no plan of canvassing that will apply indiscriminately as the conditions vary so widely in different sections. The general plan may well be left to the contract agent if the number of solicitors will justify the employment of one. The superintendent of a company with 500 subscribers in a rapidly growing city of 12,000 in one of our central states, remarked recently that he did not see the necessity of employing solicitors as they were receiving on an average of 25 contracts a month. Now supposing his rates to be $2 for business and $1.50 for residence, dividing the 25 as 8 business and 17 residence, a fair average, his gross earnings on the increase would be about $3,046 for a year. One good solicitor can secure 150 subscribers in three months, which will show $4,482 for the same time, a gain of $1,436. This man did not see that with the aid of a good solicitor he would be receiving revenue from future subscribers this month instead of several months later. We are taking it for granted, of course, that he is in shape to take care of the increase. There are cross-arms filled with "dead" circuits in good territory in many of our thriving cities to-day that ought to be helping our gross earning column materially.

In selecting solicitors the character of those who are going to represent our interests in the homes and business places ought to be taken into consideration, and care should be taken to employ only such as can command the respect and attention of the best business men in the city. No man should be started out until he is thoroughly familiar with the conditions of both his company and the opposition. If his company has irregular rates, if one of his present subscribers is receiving a certain class of service at a less rate than he can offer it, he should be able to give a satisfactory reason to those with whom he hopes to do business. It ought never to be necessary for him to say to a prospective subscriber "I will see what I can do for you," for the party is then under the impression that there are special favors possible. We are fast learning that the same rate to all will pay in the long run, however much we are influenced to vary now and then for what we consider "policy's sake."

It is a hopeful sign to note that there is an unusual demand for first-class solicitors at the present time, and recent results are particularly encouraging in that they show the advantages derived from a systematic management of trained men by the contract agent as well as the co-operation with them of all interested. The information gathered by them in their daily rounds has been found to be very valuable in assisting the operating department with the needs of their subscribers and the construction department in the matter of future development.

PHYSICIANS OF PENNSYLVANIA TOWNS THROW OUT BELL TELEPHONES.

AN interesting example of the manner in which the Bell companies lose the confidence of the public by giving deceptive rate concessions as a means of injuring a competing company, has recently come to light in Pennsylvania. The facts in the case are these:

Physicians in Pittston and West Pittston had been receiving very poor treatment from the local Bell company, their principal grievance being extortionate rates. Attempts on the part of the medical fraternity as a whole to have the trouble adjusted were met by the Bell with a minimum rate of $2 per month with such limited service and restrictions as would render a contract under these conditions valueless, the evident intention being to force a much higher rate.

A meeting of the physicians was held, at which the local manager of the Bell Company was present. During the discussion he stated that the increase in rates was not to the medical profession alone, but that the company intended to gradually discontinue the old contracts, as they were made at a rate which was only given as a fighting measure to displace the Independent system. When the physicians offered to give to the Bell a rate similar to the one they were paying the Independent company, they were informed that the Bell felt it could now raise its rates without losing any subscribers.

The statement was also made that the Independent company would be unable to extend or better its service, which is in line with the usual Bell policy of endeavoring to belittle the service furnished by its opponents.

Evidently the Bell manager had been badly misinformed, for the Consolidated Telephone Companies, the Independent concern in question, had already contracted for new equipment to be installed within the next sixty days, and furthermore instead of being on the wane it is rapidly increasing its list of subscribers. It already has practically as many telephones as the Bell in the

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same territory. The upshot of the meeting was that the physicians voted, as a body, to discontinue the use of the Bell system, and are at present using the Independent service exclusively.

As a result of an investigation conducted by the doctors of Pittston and vicinity, it is stated that of the 800 subscribers claimed by the Bell, there are a large number that have instruments in their residence and place of business as well which materially reduces the list of individual subscribers. Taking this statement in conjunction with the fact that a major portion of the Bell subscribers use the Independent service as well, there are but a few who rely upon Bell service exclusively. As the physicians are in a position to observe the relative merits of the service under the two systems, and furthermore are absolutely obliged to use the most complete and efficient service, their decision in this case would seem to be an unavoidable proof of the superiority of the Independent system.

OFFICIAL BULLETIN NUMBER NINE OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

MAPS:

Since Bulletin No. 8 was issued a toll line map of West Virginia has been commenced. This makes fourteen State Maps, all told, on which we are working at present. The map of Ohio is practically completed and will be printed in connection with the latest Independent statistics of the State for distribution at a nominal price on or about May 10th. All Ohio companies who have not furnished data for their systems are urged to do so without delay, so that their lines may be included in the map when published.

We want data from other States, too. Send us that map of your lines at once! Don't wait for a personal letter.

COMMITTEES:

The committees announced last month have taken up their work and would like to hear from practical Independent men regarding the subjects to be considered. Every one connected with the Independent movement is interested in the work of these committees, and there are many who are peculiarly qualified to assist them. Now is the time to give your associates in the telephone field the benefits of your ideas or experience. Address your communications to the chairman of the proper committee in care of this office. The committees are those on Standard Forms of Accounting, Standardization of Equipment, Standard Operating Rules and Regulations.

CONVENTION:

The Annual Convention this year will be held in Chicago, at the Auditorium Hotel, on June 26, 27 and 28. The change in place to Chicago from St. Louis, as previously announced, was authorized by the Executive Committee at the request of many prominent telephone men, in view of the fact that the Kinloch Telephone Company of St. Louis will be cutting over to its new switchboard at the time of the convention, and requests that the association meet in St. Louis next year, when it will be in a position to properly entertain them.

NEW ASSOCIATIONS:

We take pleasure in welcoming the State organization into the Independent field. The Arkansas Independent Telephone Association was organized at Little Rock on February 11. Mr. Eugene Hale, Ozark, is president; Mr. John B. King, Texarkana, secretary. A complete list of officers and report of proceedings have already been published in the journals. Success to the latest arrival!

FINANCIAL:

Independent telephone securities are regarded as more substantial and occupy a higher place in the investment world to-day than at any time in their history. Large amounts are now being sold in the markets of the country on a five and six per cent. basis. Reports received indicate that more new money will be spent this year by Independent companies than in any one year in the past. A great deal of this will be used in taking care of new development by making extensive additions to existing plants and extending toll lines into undeveloped territory. A large amount, however, is being spent on new properties in building up the few remaining cities where Independent exchanges have not been installed. That the value of Independent securities is being generally recognized is attested by the fact that some of the largest financial interests of the country are investing heavily in these securities and consider them as safe and profitable as the securities of other public serving corporations. The preference shown by the citizens of various places for Independent service does much to increase the favor with which Independent securities are being regarded by investors.

TELEPHONE PUBLICITY:

The telephone situation is being ably presented to the reading public of the country in a series of articles, "Fighting the Telephone Trust," by Paul Latzke, which are being published in the Success Magazine. The first and second of these have already appeared in the February and March numbers. Jesse W. Weik has also written an able article entitled "The Telephone Situation," which appeared in the Atlantic Monthly for February and has been reviewed in the Review of Reviews for March.

SUPPLY DEPARTMENT: The "Shield."

We are glad to note an increased demand for the standard toll sign. This sign is, in fact, the banner of Independent telephony and all Independent companies should take pride in displaying it at their exchanges and pay stations. Show the people where you stand and help educate them to "Look for the Shield."

Illustrated catalogue for the asking.

The popularity of the gold-plated "shield" buttons continues. Are you wearing one? Samples 35c.

OBITUARY:

Mr. P. T. Spencer, secretary of the California Independent Telephone Association, died February 12. We extend our sympathy to his family and friends and his fellow members of the California Association. They have sustained a severe loss in the death of so true a friend and so able an officer. Mr. Spencer was one of the delegates from California to the National-Interstate Convention last year and took an active interest in everything pertaining to the welfare of Independent telephony. His death at this time is to be deeply regretted.

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QUERIES

SHUNTING EFFECT ON PARTY LINE.—(673.)

Each bridging telephone with a 1,600-ohm ringer on a party line detracts what per cent. from the talking circuit:

1. With receivers up?
2. With receivers down? J. D. J.

1. One 1,600 ohm ringer set, bridged, with the telephone on the hook has no very noticeable effect on talking current. As nearly as can be determined by laboratory tests the reduction in transmission is about 3 or 4 per cent. That is, each bell reduces transmission from what it was by about 4 per cent. With 10 bells bridged therefore the transmission will be .96x.96x.96x.96x.96x.96 x.96x.96x.96x.96, or 67 per cent. of what it is with no bells. This is roughly equivalent to the addition of 100 miles of No. 12 copper circuit.

2. The reduction of transmission with the telephone off the hook depends on the type, or the impedance of the receiver and induction coil. With a 65 ohm receiver and 180 ohm induction coil such as are used by the Bell companies the reduction is in the neighborhood of 15 per cent. It is somewhat greater with the bridged set nearer the receiving end than if it is near the transmitting end.

CHARGING STORAGE BATTERIES IN EMERGENCY.—(674.)

Will you kindly let me know if there is any method of charging a 24-volt battery, type E. T. Chloride Accumulator, from a 500-volt circuit, in case of a breakdown of the regular charging generator? R. L.

The batteries may readily be charged from the 500 volt circuit provided that a proper resistance is inserted in series with the batteries to be charged.

One practical form of resistance is a bank of incandescent lamps, connected in sets as shown in the accompanying diagram, Fig. 674a. For charging 11 cells, type E. T., the resistance should be adjusted to make the current in the charging circuit approximately equal to 4½ amperes, which is the normal charging rate for these cells. This result may be secured by the use of four parallel sets of 32 c. p. 110 volt lamps, each set containing five lamps in series, or with eight parallel sets of 16 c. p. 110 volt

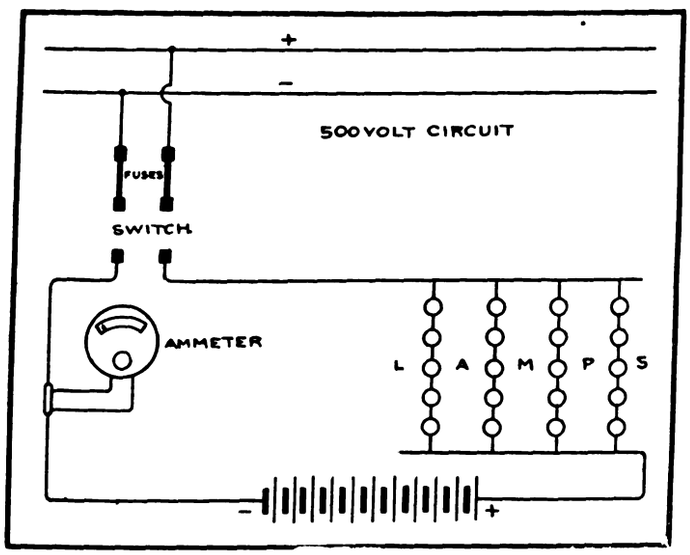

Fig 674a.

lamps, each set containing 5 lamps in series, or the equivalent of these combinations.

If lamps are not available a water rheostat may be quickly set up, and used as a substitute. This consists in one form of a non-metallic tank, containing a weak sulphuric acid or saline solution, in which are immersed two metallic plates, which serve as terminals of leads in the charging circuit. The plates are suspended in such a way that the distance between them can be altered, thus varying the resistance and consequently the amount of current passing through the batteries.

Another less satisfactory method of constructing this apparatus, which, however, is illustrated in Fig. 674b, consists in the use of a metallic pail, which is set upon an insulating support and forms one terminal of the circuit, the other terminal being a metallic

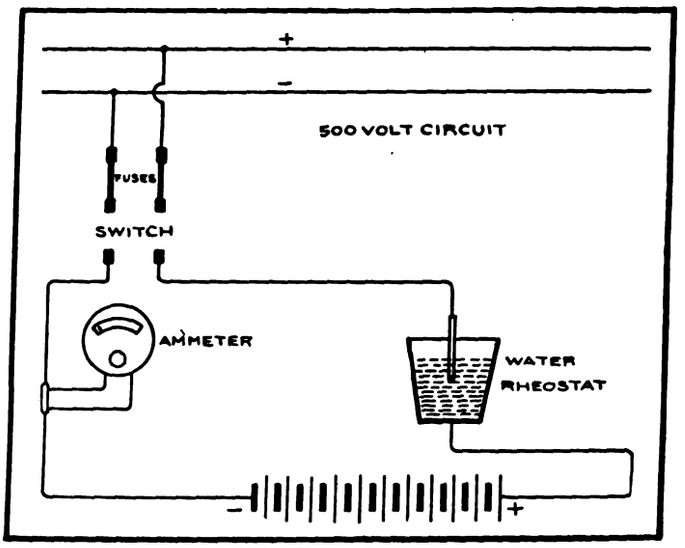

Fig. 674b.

strip which may be immersed to a greater or less degree in the solution.

The water rheostat method is less to be recommended than that in which lamps are employed, for two reasons: In operation it requires very constant and careful attention and adjustment to keep the current at anything like the normal rate; furthermore, great care is necessary to prevent the touching of the plates against each other, which would, of course, practically short circuit the 500 volt system.

Whatever form of resistance is used, the battery should be connected to the grounded side of the 500 volt system, not only to avoid shocks when inspecting the battery, but also to prevent any chance of injuring the battery insulation.

In making the transfer from the regular generator to the 500 volt circuit the wiring should be so arranged that the charging ammeter will be included in the circuit in order that the amount of current passing through the cells may at all times be evident.

RINGING BELLS WITH LIGHTING CURRENT.—(675.)

Will you please tell me the requisite construction of a transformer to transform a 110-volt light current into a current with sufficient voltage and amperage to ring the bells of 15 telephones with 1,000-ohm ringer coils, bridged across a circuit of No. 12 iron wire, five miles long? The light current to be converted from direct to alternating through a "Warner" pole changer? C. L.

No transformer is necessary for the purpose you mention. All that is required is to reduce the amount of current which passes out on your line. This can be accomplished by connecting a 32 c. p. 110 volt lamp in series with one side of the lighting circuit, between the main wires and the pole changer. The pole changer will convert the direct current into the alternating current necessary for the ringing of the telephone bells; as the lamp will reduce the amount of current, and to a certain extent the voltage, 110 volts will not be too heavy for your purpose with this arrangement.

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THE EDITOR'S PAGE

PROPOSED EXTENSION OF TELEPHONE SERVICE.

TRANSACTION of postoffice business in urgent cases over telephone lines would be secured by the passage of a measure which is now being considered by the national government. This is in line with a number of other examples of the use of the telephone as an auxiliary method of communication which have been in use long enough to enable the prediction to be reasonably made that the proposed plan would produce results of considerable practical value.

The comparatively low cost of the telegraph for the transmission of short messages over considerable distances causes this method of communication to be used in preference to the telephone in a large number of cases. The sending of a messenger to deliver communications involves a delay which is undesirable and unnecessarily expensive in instances where the person who is the recipient of the message is to be found at a considerable distance from the telegraph office. It has grown to be a common practice to telephone the message from the receiving office.

In this manner the principal causes of delay are eliminated. The persons concerned receive all the advantages which come from the instantaneous nature of electrical transmission, without the payment of the larger costs attached to the use of a telephone line over the entire distance. The plan has proved to be extremely useful to the public.

The proposed adaptation of the telephone to uses of the postoffice is probably a logical outgrowth of the same plan, and would possess the same advantages. It is probable that these benefits would be much greater in rural communities and towns which are not thickly settled than in the larger cities. Residents of districts of this nature are either wholly without delivery service, or receive their mail at intervals of hours or longer on rural free delivery routes. It is, nevertheless, frequently true that the number of incoming mails to the postoffice which is the distributing center is sufficiently large to bring in letters several times each day. These letters must then lie idle until such a time as the carrier may be able to take them on his daily trip, or until the persons to whom they are addressed finds it convenient to call and receive them.

If the bill is enacted, a special stamp will be affixed to letters when delivery of the contents over the telephone is desired. Upon the receipt of such a letter the postmaster at the receiving station will call up the person to whom the letter is addressed and read to him the message. In this way a large amount of the delay which at present is experienced between the time a letter reaches the postoffice and its arrival in the hands of the person to whom it should go will be eliminated. The expense of such a procedure will be comparatively trifling even as compared with the telegraph. As the sender of the letter is usually sufficiently familiar with the train service to points to which he wishes to communicate, it will be impossible to estimate the time which must elapse before the delivery of the message very closely, and there should be no difficulty arising from an unexpected delay of an important message.

A further advantage comes from the fact that many communities are provided with a very complete telephone system where telegraph service is extremely poor. Many small towns are wholly without telegraphic connections, while a very large proportion of the residents are telephone subscribers. Other towns, even though they are provided with a telegraph office suffer from poor and expensive messenger service. In such places the method proposed will furnish means of receiving communications within a moderate time from distant points at small expense. Aside from the important advantages which will so evidently be useful to the public, the measure is of wide interest to telephone companies. It will furnish a most useful argument in favor of extensions of the service. The subject seems to be well worth the attention of telephone companies and managers at this time, when united action will tend to have its maximum effect.

UNJUSTIFIABLE TELEPHONE MESSAGES.

A PARTICULARLY strong argument in favor of measured service for business establishments is furnished by some figures recently given out concerning the uses to which the telephone has been put in certain of the government offices in Washington. An investigation was carried on for a period of two months, and the nature of telephone messages by employees during business hours was determined. This information was then classified, and the results of the division according to the nature of the business showed that only 23 per cent. of the calls were made on affairs which directly related to the government service, while 77 per cent. were personal calls. The sub-division of the personal calls showed that a very large per cent related to entirely frivolous affairs.

Among the items may be mentioned theatre calls, which were 28 per cent. of the whole number; bucket shops took 8 per cent. of the business, and loan calls 4 per cent. The clerks even went so far as to make sufficient poker engagements over the telephone to account for 7 per cent. of the entire business transacted over the telephone lines to the government departments in question.

This experience is doubtless parallel to that of many modern business establishments, and in such cases the telephone company, which operates under a flat rate, is burdened with a large number of messages over each line which could readily be avoided. The result of this is, in addition to the extra load which it places upon the operators, to increase the number of busy reports for the lines over which these conversations take place. The fact that social conversations are usually of greater length than those relating to business matters, is one which must be considered in this connection. The result is the tying up of the lines, which causes the persons calling for the establishment to feel a considerable degree of dissatisfaction with the service in general.

Such dissatisfaction is extremely likely to be visited upon the telephone company, as the head of the business establishment is usually very far from being aware of the extent to which his lines are used upon affairs other than his own. He is likely to be familiar with the regular business carried on over his wires, and to assume that when they are not in use for messages of this class they are idle, and that no one should have difficulty in reaching him. The contract agent has a very poor chance to induce such a subscriber to take additional lines, as he has no practical data to show the necessity of such action from a business standpoint. One of the principal advantages which is inherent in the measured service plan of charging is the elimination of these unnecessary and frivolous calls. As the subscriber watches the number of messages more closely he is able to check such uses of the telephone lines, with the corresponding advantage which comes from the saving of the time of his employees, in addition to a certain improvement in his service. On the other hand, those messages which do go out bring a direct revenue to the telephone company, instead of constituting a drag for which no recompense is received.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

INJURY FROM FALLING INSULATOR.

An insulator improperly adjusted fell and injured a man passing below. We erected and were maintaining the pole, but the cross arm from which the insulator fell was occupied by the wires of a telegraph company under contract with our company. Are we liable under these circumstances?

R. F.

IT is the opinion of the editor that you would be. The telegraph company might also be liable, either jointly or severally, with you. For a case in point see Quill v. Emp. St. Telep. & Teleg. Co., 34 N. Y. S. 470, 37 N. Y. S. 1,149.

HEIGHT OF WIRES AND EXTRAORDINARY LOAD.

A load of poles nearly thirty feet high was driven along the highway across which our wires ran; the load ran into the wire and the driver, who was walking beside the load, was hurt by one of the poles falling off. Can he claim damages when he knew how high the wires were? C. L. J.

TELEPHONE and telegraph lines must be erected along public highways so that their wires do not obstruct ordinary travel over such public highways or render it unsafe, otherwise they are liable in damages for injuries suffered by persons passing thereover; but a company would not be responsible for extraordinarily high loads, and especially when the man injured knew the wires to be of ordinary height.

FIRE CAUSED BY DEFECTIVE WIRING.

IT has been held in a suit for damage by fire caused by defective wiring that the fact that there had been no fire in the building a number of hours, that the fire originated at the exact place where electric wires entered the building, the defective character of the wires used in installing the electric fixtures, the negligent and unworkmanlike manner in which the connection was made with partially uninsulated wire, the probability of fire being caused thereby, all these things standing undisputed and unexplained, justify the submission to the jury of the question of the electric company's negligence. Romano v. Vicksburg Railway and Light Company, 39 Southern, 781.

NEED NOT PAY CITY LICENSE.

SIX suits filed by the city of Lexington, Ky., against the Western Union Telegraph Company, the Postal Telegraph Company, Adams Express Company, the Southern Express Company and two local telephone companies, instituted for the recovery of $250 per annum as a license tax for the privilege of doing a local business, which have been pending in the United States District Court, have been dismissed by Federal Judge A. M. J. Cochran, upon the motion of the plaintiff. The suits were based upon a city ordinance imposing a license tax upon the companies named, which recited that the license was merely for the privilege of doing a local business and not intended to apply to any business between this city and others in the United States.

RESTRAINING THE USE OF EXTENSION TELEPHONES IN CHICAGO.

THE Chicago Telephone Company has filed a bill for an injunction to restrain the Madison Electric Company from installing private telephones connecting with its wires. The position taken by the electric company is that it has a perfect legal right to tap or otherwise connect with wires of the telephone company, that the wires are fixtures of the building, and that the proprietary rights of the telephone company end at the building line. The petitioning corporation's position is that it sends its currents over the wires, even although they may be fixtures, and that no other company has a right to operate desk extension telephones by means of its power.

The electric company advertises that it can save people $30 a year on each desk extension telephone, and it has installed something like 6,000. There are approximately 105,000 telephone subscribers in Chicago, and there is an average of from three to four telephone extensions on each trunk line. It is stated that one jewelry firm has 22 desk extension telephones on one trunk line, and that Beach & Beach and Smoot & Eyer, attorneys in the Ashland block, have ten telephones on one trunk line. The lawyers have been made defendants with the Madison company to the bill for injunction. Beach & Beach a year and a half ago obtained a temporary injunction restraining the Chicago company from interference with their ten extension instruments, based on a threat to deprive them of telephone service, and the matter still is pending in the courts.

Albert D. Wheeler, president of the telephone company, said: "The bill charges conspiracy on the part of certain attorneys and the Madison Electric Company to interfere with our system, tap our wires, use our current, and cause our subscribers, by means of misrepresentation, to break their contracts with us. It is impossible for us to keep up our system to the standard without instruments of uniform character."

TO DELIVER LETTERS OVER THE TELEPHONE.

INDEPENDENT companies are expecting the passage of a bill now before congress, providing that letters may be specially stamped so that the receiving postmaster may be required to call up the addressee and telephone the contents. It is planned to have a stamp something like that used for special deliveries, and costing ten cents. The sender who is desirous of avoiding delays in delivery, where there is only one route service a day, affixes the stamp. As soon as the letter is received, the postmaster will be required to call up the person to whom it is addressed without delay. The result of such a measure will be to greatly popularize the use of the Independent telephones.

WISCONSIN TELEPHONE RATE LAW CLAIMED UNCONSTITUTIONAL.

IT is stated that the Wisconsin Telephone Company will defend the suit instituted by the attorney general for an alleged violation of the laws forbidding telephone companies from charging a higher rate in one city than in another of the same class. The company will contend that the act is unconstitutional and has been drawn so that it really applies to the Wisconsin company and no other. The position of the company is thus stated:

"As a matter of fact there is no actual discrimination in favor of the city of Janesville as against any other city. Population does not entirely fix the rates. There are many other things that must be taken into consideration. For instance, there is the cost of help and the cost of material. It is just like the cost of living. It may cost more to live in one city than it does in another, and it may cost more to run a telephone exchange in one city than in another."

The suit charges that Beloit has higher rates than Janesville, although both are in the ninth class.

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IN THE OPERATING FIELD

SEMI-ANNUAL CONVENTION OF INDEPENDENTS HELD AT OKLAHOMA CITY.

MATTERS of interest to the members, in the operation and maintenance of the lines and of methods pursued in giving better service to patrons, were discussed at the meeting of the Oklahoma and Indian Territory Telephone Association held on February 12.

Officers of the association were elected, as follows: President, H. Furman, Geary; vice-president, E. S. Moody, Okeene; secretary-treasurer, L. T. Hine, Purcell. Executive committee—E. E. Westervelt, Oklahoma City; F. H. Wright, El Reno; J. A. Moad, Elk City, and W. J. Steel, Kingfisher.

C. O. Blake, G. W. Bellamy, H. T. Smith, F. H. Wright and Wm. Grimes, officers and directors of the Topeka and El Reno Telephone Company, were elected members of the association. In addition to the valuable progress made in the meeting, the visiting delegates received a great deal of pleasure from the cordial hospitality extended by the Pioneer Telephone and Telegraph Company. The members of the association will have their next meeting at the annual convention in Oklahoma City, the second Monday in August, this year.

SYSTEM AT MAYSVILLE, KY., IN A FLOURISHING CONDITION.

THROUGHOUT the state of Kentucky the Independent business has been growing very rapidly during the past year. New plants have been built and an extensive system of toll lines is being constructed which will ultimately reach every point in the state. Among the companies which show a marked increase in the list of subscribers is the one at Maysville. Under the direction of a competent and courteous management, the service has been extended to upwards of five hundred subscribers, who, with the exception of a number of rural lines, have Independent direct lines. The company gives its subscribers free service to 85 subscribers at the Mays Lick exchange, and to 195 connected with the Mason county system. Upwards of 57 toll points in the same state and in Ohio can now be reached direct and the rates have been placed as low as is consistent with the furnishing of good service.

An interesting feature of the February directory is the introduction of general local advertising in the directory pages. The advertisement of each firm follows its name in the regular list, so that a person looking through the pages of the directory is constantly reminded of an opportunity to give an order or make an inquiry by telephone. This plan can be made to pay for a large portion of the expense incurred in getting out new issues, besides assisting in emphasizing the value of the telephone to the business man.

The officers of the company are: Walter Matthews, president; S. H. Mitchell, vice-president, and Dr. Edwin Matthews, secretary-treasurer and general manager.

GREENE COUNTY TELEPHONE COMPANY WINS OUT IN WAYNESBURG.

INDEPENDENT telephone affairs in Greene County, Pa., have been making good progress under the direction of T. B. Lee, manager of the Greene County Telephone Company. Since the consolidation of the company formerly operating in this region with the Bell company Mr. Lee has been endeavoring to supply the town with Independent service, and has met with opposition which has taken the most annoying forms. His company was granted the privilege of stringing wires upon the poles of the Western Union Telegraph Company, and, while engaged in this work he was ordered to discontinue by the burgess. Upon refusal to do so Mr. Lee was arrested and sentence imposed upon a charge of disorderly conduct. The case was carried to a higher court, which reversed the decision, and stated that Mr. Lee was engaged in an entirely lawful occupation, which he had a right to pursue, and directed that the costs of the proceedings should be placed upon the borough.

Since this decision has been given wires for Independent lines have been carried into Waynesburg on the Western Union poles and sufficient telephones connected to give Waynesburg citizens connection with outside points. The line connects with the Carmichaels Telephone Company, a number of farmers' lines, with Uniontown and other towns along the Monongahela River, and with Pittsburgh over the lines of the Pittsburgh & Allegheny Telephone Company. The Independent lines have been decorated with flags to celebrate the victory, which is much similar to that recently won by Manager Lee when he entered Washington, Pa., in the face of the most determined opposition.

CONSOLIDATION OF INDEPENDENT INTERESTS IN MISSOURI.

AT a recent meeting held at Bunceton, Mo., plans were perfected for the consolidation of the Independent systems of the county. A new company to take over the plants of the existing companies was organized with a capital stock of $200,000.

It is the intention of the Independent company to systematically cover Cooper County with wires so that every precinct will be provided with connections. The consolidation gives a service of 4,000 telephones with 182 miles of trunk line and 150 miles of branch line. Additional trunk and branch lines will be built within the next year.

An executive committee was appointed by the convention to serve for the company. This committee is composed of John S. Elliott, N. A. George, Ed. Cramer, C. A. Sombart, Dr. J. T. Taylor.

GOVERMENT OWNED TELEPHONES FOR ONTARIO.

FOLLOWING the example set by Manitoba, the municipalities of Ontario are circulating petitions for government ownership in that province and for power to expropiate the lines of the Bell Company. The movement was started by Mayor Coatsworth, of Toronto, and is being received with great favor by all classes. In an editorial on the subject the Winnipeg *Telegram* had the following to say: "There is not in all Canada a public service corporation that has been more successful in its dealings with governments and municipal councils than the Bell Telephone Company. The Bell Company has won notable victories over the public at Ottawa, at Toronto and at most of the Eastern capitals. It profits to-day from an illegal contract with the Canadian Pacific Railway, under which the Bell has exclusive right to telephone connection with the Canadian Pacific Railway stations all over Canada. The contract, deliberately designed to shut Independent telephone companies out of railway stations and to strengthen telephone monopoly, was clearly a restraint of trade, but though it was fought, and fought vigorously for two years, it is still valid. The Dominion government and railway commission in turn have yielded to Bell influence and authorized the continuation of a notoriously illegal contract. This case is mentioned merely as an instance of the triumphs which the Bell Company has had in the politics of Canada." The agitation in Ontario for government owned telephones is so strong that the local legislature can do

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GRAY AUTOMATIC PAY STATIONS PAY

and cost no more than complicated devices which keep the rep ir men busy, the collectors idle, and you in trouble.

Send for Catalogue of 1906

GRAY TEL. PAY STA. CO., HARTFORD, CONN.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Cheap, 9 sections, American Electric, express, magneto switchboard; we will sell one or all; 500 magneto telephones; 100 magneto desk sets; 200 generators, all types; 100 bipolar receivers; 200 ringing coils; 80 to 120 ohm. Address the Tuscarawas County Telephone Company, New Philadelphia, O. 571

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—1,800 line, multiple, lamp signal, Central energy switchboard of latest Stromberg-Carlson make. Just from the factory. Not yet unpacked. Terms to suit. Also modern telephone exchange and electric light plant in progressive South Carolina town of over 2,000 inhabitants, $14,000; $3,000 cash; balance on easy terms. Piedmont Electric Co., Anderson, S. C. 563

FOR SALE—300 Eureka Express Switchboard drops and other parts. Kellogg Keys. Write for prices. The Lyons Telephone Co., Lyons, Kan. 573

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

POSITION WANTED—Can make your magneto system of 400 to 1,900 subscribers give best possible service and keep it that way. $80.00 per month. Save you money. Address Box 577, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 577

WANTED—State representative wanted by telephone manufacturer for Pennsylvania and Ohio. One familiar with common and local battery apparatus. Address Box 578, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 578

WANTED—Continued

A SQUARE deal is what we aim to render both employer and employee, when seeking the right man for a place, or the right place for a man. Without effort on your part, without endangering your present position, and without using your employers' time, we hunt up the position for which you are best qualified. Let us find the position for you. Hapgood's, Suite 511, 309 Broadway, New York City. 464

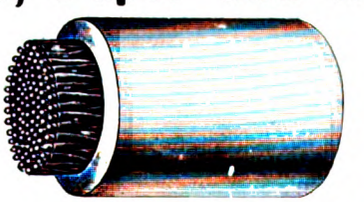
WANTED—Position by an all round cable splicer and switchboard man. Best of references furnished. Address Frank R. Rice, Menomonie, Wis. 572

WANTED—Chief operator for prosperous Independent company in Southern city. Splendid opportunity for right party. Address Box 569, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 569

WANTED—Position as manager, superintendent of construction or wire chief by all round telephone man. At present wire chief and construction man for large company. Best of references. Can make good. Address Box 575, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 575

WANTED—Cable splicer. Young man thoroughly competent to splice lead cables, underground and aerial. Work must be first class. Permanent position to right man. Address York Telephone Company, York, Pa. 576

Cables, Paper and Rubber



THE F. BISSELL COMPANY.

TOLEDO, O.,

TOLEDO, OHIO · THE F. BISSELL COMPANY

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nothing but follow the example set by Manitoba in taking steps to expropriate the Bell lines and give telephones to the people at one third, or less, the present prices charged.

A TOLL SERVICE REMINDER.

METHODS of keeping their facilities for toll service constantly before the public are being constantly devised by Independent managers. A very attractive and interesting piece of advertising matter has been issued by the Winona Tele-

phone Company, of Winona, Minn. It is a small blotter printed in attractive colors, and presents the situation and the argument clearly and appropriately.

CHICAGO MAYOR SEEKS INFORMATION ON MEASURED SERVICE IN NEW YORK.

THROUGH advertisements in the newspapers of New York, where the measured service system of charging is in use, Mayor Dunne and Chairman Young, of the committee on gas, oil and electric lights, expect to gain valuable information concerning telephone rates on this plan, which the Chicago Telephone Company desires to put into effect.

By information of this kind the mayor believes a fair basis of rates in Chicago can be determined and the question of the comparative desirability of measured service or flat rate can be thrashed out thoroughly.

The advertisement is as follows:

To the Telephone Using Public of New York City: The city of Chicago has now under consideration the question of the revision of telephone rates. In order to obtain information upon the subject the telephone using public of New York are hereby requested to communicate with the undersigned in relation to the measured rate of telephone service now prevailing in the city of New York. Is it satisfactory to the public? Are the rates, in your opinion, reasonable or unreasonable? Is a measured or a flat rate preferable?

EDWARD F. DUNNE,
Mayor of Chicago.
LINN H. YOUNG,
Chairman Committee on Gas, Oil and Electric Lights.

It was suggested that the Bell Telephone Company, which controls both the Chicago and New York companies, might be interested in the New York "referendum" and the replies received by the mayor might be biased, but he did not believe this method will be resorted to by the company.

"At any rate, some idea of the conditions should be gained by this appeal," he said.

NEW LONG DISTANCE TELEPHONE COMPANY TO CONSTRUCT ADDITIONAL TOLL LINES.

ORDERS for the construction of long distance lines which will be available for use by many thousand Independent subscribers have recently been issued by the management of the New Long Distance Telephone Company of Indianapolis. It is said that new trunk lines will be extended to South Bend, where they will connect with the east-and-west trunk lines that are to enter Chicago.

The construction of new trunk lines to Ft. Wayne, Louisville and Richmond to improve the present connections to Eastern points, and to Terre Haute, to improve the St. Louis service, will also be taken up very soon, but the rapid growth of the business has brought a demand for additional facilities. The new lines will be of No. 8 instead of No. 10 copper wire. Trunk lines to all of these points are now in service. Orders also were given to make additions to the equipment in Indianapolis to take care of the new business that is coming to the company and to improve the service.

SAN FRANCISCO BOARD OF SUPERVISORS PASSES TELEPHONE FRANCHISE ORDINANCE.

ON March 6th the San Francisco Board of Supervisors passed, by a vote of 14 against 4, an ordinance providing for the sale of a telephone franchise to the highest bidder. April 23d is the date set for the reception of bids.

INDEPENDENTS IN NOBLE COUNTY, OHIO, CONSOLIDATE.

AN important merger of Independent telephone companies was recently consummated at Caldwell, Ohio, when all the Independent concerns of Noble County consolidated. Marietta capitalists are interested in the deal, which is considered a great victory over the Bell company. Every individual company in Noble County was represented at the conference and signed the agreement.

The new company will be known as the Noble County Telephone Company. The capital stock is $100,000, all of which has been subscribed.

The stockholders elected the following directors: J. H. Shankland, J. Sparling, H. W. Kuntz, L. W. Wheeler, J. S. Jones, Arthur Schafer and W. H. Bowron. The directors organized by electing Mr. Shankland president, Mr. Wheeler vice-president, Mr. Schafer treasurer, and Mr. Bowron secretary.

The companies included in the merger are the Caldwell-Marietta Telephone Company, the Caldwell Independent Telephone Company, the Farmers' Exchange and the Summerfield Telephone Company. The merger was brought about by F. L. Beam, of the United States Telephone Company, of Columbus; J. B. Rhodes, of Zanesville, and Frank Armstrong, of Armstrong Mills.

The new company has over two hundred miles of line and more than two thousand telephones. As soon as possible a number of improvements will be made and the lines extended.

INDEPENDENT COMPANY IN MANITOBA SHOWS GOOD DEVELOPMENT.

IN the summer of 1904 some farmers living in a southeasterly direction from Crystal City, Manitoba, undertook to build a telephone line fourteen miles long to connect their farms with that town. Twenty-one farmers along the route agreed to take telephones and pay a proportionate share of the cost. The line was completed in the fall of the same year and worked perfectly. In the spring of 1905 four new lines were built running into the country in different directions for distances of ten to fifteen miles. A central office was established and a local system in the town was put in operation. In this way the Independent company was started. To-day there are eighty-five rural subscribers and forty-two in Crystal Lake. The plant is co-operative, and the cost of construction to each subscriber is stated to have been approximately $45. A board of managers attends to the business and looks after the maintenance of the lines. For this purpose each subscriber pays about $6 a year.

During the coming summer two new lines will be built, and it is confidently expected that before the year has passed there will be 250 subscribers in service.

The Bell system which was installed in the town contemporaneously with the building of the first local line, has not proved to be a very strong competitor. The Bell rates to-day are $24 for commercial service and $18 for private dwellings. It has less than twenty-five connections in town and has made no progress in the country.

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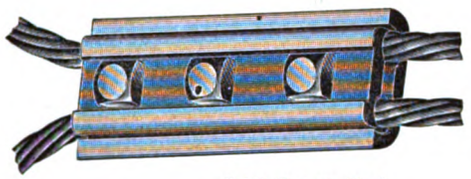
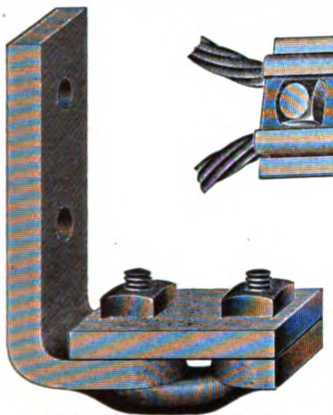
We Make a Few Good Things and We Make Them Right

Look at our DEAD END HANGER. At a glance you can see the simplicity of design, and the great strength.



Solid Forged Steel
D THREE-BOLT CLAMP



Forged Steel Galvanized
DEAD END HANGER
(Patented)

Our D THREE-BOLT CLAMP is the strongest and best. It requires no clips; is the most economical; it never breaks and never slips.

Write for Catalogue of these and other good things

NORTON TOOL CO., West Park, Ohio
ELECTRICAL DEPT.

NEWLY ORGANIZED
Telephone Companies ?
WHAT HAVE YOU DONE

ABOUT YOUR

Incorporation Records By-Laws, &c. Stock Certificates and Bonds?

We have new original Telephonic Designs showing the National Emblem in its beautiful colors.

Spring Construction Work WILL SOON BE UNDER WAY!

Have you the proper records to take care of this important work and safeguard your Material and Pay Rolls?
We furnish New or Old Companies with Complete Office Accounting and Filing Systems.

THE Edwards-Hine Co.
TELEPHONE SYSTEMATIZING DEPARTMENT
5 and 7 Pearl Street, Grand Rapids, Mich., U. S. A.
Please mention American Telephone Journal

Strength--

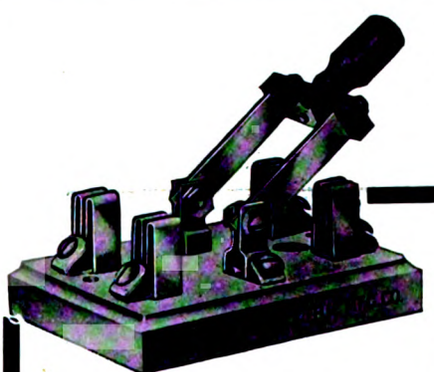
STRENGTH means safety.
SECURITY POLE SEATS are strong and safe. Weighs only 28 pounds, will carry a ton. No rough edges to tear hands or clothing. No wood used. Framework of angle iron, bend not notched. Cross bars machine riveted. SECURITY POLE SEATS will outlive any cable pole. Immediate Shipments.

Novelty Pothead and Sleeves

Don't call an expert plumber to wipe your lead joint. It is liable to leak, cannot be opened and used again. Use our NOVELTY POTHEAD and SLEEVES; can be inspected any time without injury to your cable. Waterproof after inspection same as before. Write for information and blanks for ordering.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK

THE F. BISSELL COMPANY
TOLEDO, O.



All Copper. Made in 4 Styles

TO GET THE BEST VALUE

is the aim of every economical buyer, and the manufacturer or dealer who meets this condition will get the business. We have it in the switch line.

Trumbull Switches

are built of copper throughout and so designed as to counteract the warping of the Porcelain Base.

The U-shaped formation of the contact springs insures an even and constant pressure on both sides of the knife blades, which is rarely the case with any other switch.

This construction is of the greatest importance where a switch is employed in connection with telephone circuits. It enables the contacts to be kept clean without cutting and eliminates the possibility of resistance due to poor connection.

Use them in your exchange or rural lines and every place where knife switches are employed.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Ave., PLAINVILLE, CONN.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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TELEPHONE PATENTS

TELEPHONE.

Arthur F. Boardman, Somerville, Mass., patents (No. 811,029; dated Jan. 30, 1906; filed April 10, 1905; serial No. 254,646; and assigns to the Electric Gas Lighting Company, Boston, Mass.) a telephone for ships, mines, etc.

The essential feature of this invention is to provide means whereby moisture can be excluded from the mechanism. This the inventor accomplishes by employing a metal box and making all joints by means of washers or gaskets. The switch to operate the mechanism is of the plunger type working in watertight bearings and controlled by the movement of the external cover or door. When this is closed the plunger is depressed; opening the door releases it and it thus cuts in the telephone. Signaling buttons are spaced around the inside of the box for use in calling different departments. These also work on the plunger principle. The mouthpiece of the transmitter extends downward and then outward in the form of an L to prevent the lodgement of water in its interior.

SWITCH PLUG MECHANISM.

Adolph C. Gilgen, Passaic, N. J., patents (No. 812,491; dated Feb. 13, 1906; filed Nov. 25, 1904; serial No. 234,139) and assigns to the New York Automatic Telephone Co. of Paterson, N. J., a switch plug mechanism.

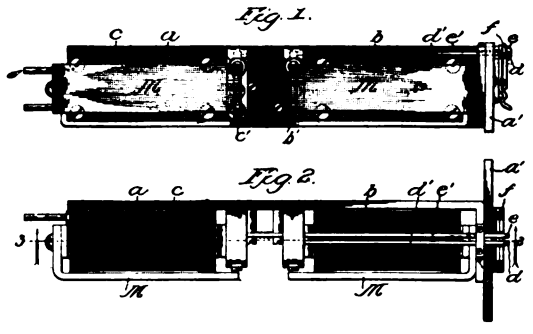
This invention relates to intercommunicating systems and has for its object the improvement of automatic switching mechanisms of the push-button type.

The general principle involved is similar to that employed in all similar systems, the difference existing in mechanical construction. Means are disclosed for constructing and operating a switch in which the contacts shall be kept clean and bright, the parts be accessible for inspection, and for automatically resetting the mechanism by the movement of the receiver hook.

ANNUNCIATOR DROP.

Charles E. Scribner, Jericho, Vermont, patents (No. 812,954, dated Feb. 20, 1906; filed June 24, 1905; serial No. 266,759) and assigns to the Western Electric Company, of Chicago, Ill., an annunciator drop for telephone switchboards.

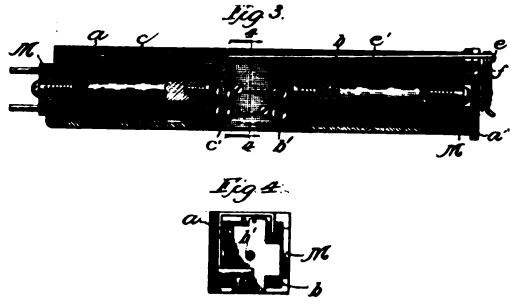
This invention is in the nature of an improvement upon the annunciator described in patent No. 552,726 of January 7, 1896, this improvement being secured through the act of polarizing the



two magnets and their biased armatures, so that upon the passage of direct current of the proper sign the catch normally holding the indicator will be withdrawn, but the other catch will remain undisturbed, thus allowing the indicator to be displayed. When alternating current is passed through the coils of the magnets their armatures will vibrate out of phase and consequently one of the catches will at all times be in engagement with the indicator, thereby preventing it from being operated.

The principal object of this invention is to provide a drop for party lines which will enable the subscribers to call each other without disturbing the exchange.

This can readily be accomplished by so connecting the sub-



station generators that under certain conditions they can be made to deliver either alternating or direct current at will.

Referring to the illustrations, *b*, *c* are two electromagnets having armatures *b'*, *c'*, which are pivoted on brackets carried by the frame *a*. Each of the magnets and its armature is polarized to respond to direct currents of polarity opposite to that which produces a response in its companion. The polarization of the magnets is effected by means of the permanent magnets *M*. The armatures are biased by means of suitable springs which prevent them from responding except to currents which are flowing in the proper direction to strengthen the magnets. The permanent magnets have their poles reversed to impart opposite polarity to the two electromagnets and their armatures, rendering them responsive to current of opposite sign.

Latch arms *d'*, *e'* are secured to the armatures *b'*, *c'*, respectively; latch *d*, carried by the armature *b'* normally engaging the shutter *f*. On attraction of the armature *b'* it is moved out of engagement with the shutter to permit it to fall into a position of display. Latch *e*, on the contrary, is normally out of engagement with the shutter, being brought into the holding position by the attraction of armature *c'*.

When direct current of the polarity to which magnet *b* is responsive traverses the coils of the magnet, the latch *d* releases the shutter, which falls into position.

If, however, alternating current is passed through the magnet coils, their armatures will be rapidly vibrated, but owing to the adjustment of the springs and the different polarities of their magnets, they will vibrate out of step, consequently one latch will always be in engagement with the shutter, thus preventing its operation.

AUTOMATIC SYSTEM.

Bernhard Kugelmann, Bad Kissingen, Germany, patents (No. 814,219; dated March 6, 1906; filed September 15, 1903; serial No. 173,285) an automatic telephone system.

This invention discloses means for the automatic connection of one subscriber's line to another.

The selective devices consist of Thomson bridges located at the exchange and operated in conjunction with electro magnetic devices to establish connection between lines. As the use of mathematics in connection with somewhat complex circuits enters into a further description of the patent we would suggest that all persons interested procure a copy.

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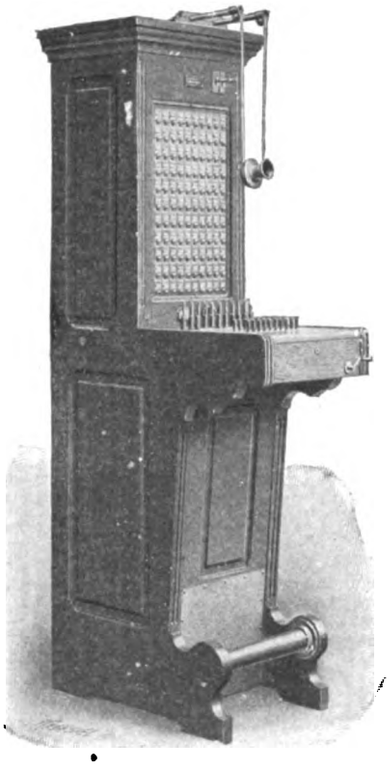
"UNITYPE" SWITCHBOARDS

TRADE MARK

PATENTED APRIL 25, 1905.

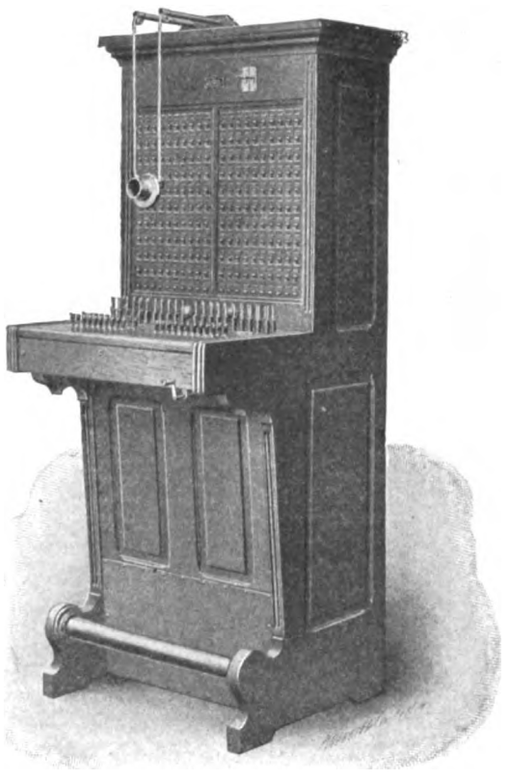


NO. 53 CABINET—50 DROPS.

Possess one bad feature. They deprive the trouble man of his job : : :

Built in every size to accommodate the wants of the smallest or largest exchanges, this apparatus offers every feature for speedy and perfect operation, free from large maintenance expense.

THE SUMTER TELEPHONE MFG. CO.
SUMTER, S. C., U. S. A.
will tell you more about them



NO. 53 CABINET—200 DROPS.

Sandwich Pole Changer Company
400 Eddy St., Sandwich, Ills.

Do You Get Our Rings? If not write for Prices and Catalogues of our

Pole Changers
Ohmmeters
and
Duplexers

Guaranteed to you.

DUPLEXERS

That Will DUPLEX
THE ILLINOIS AND SANDWICH DUPLEXERS

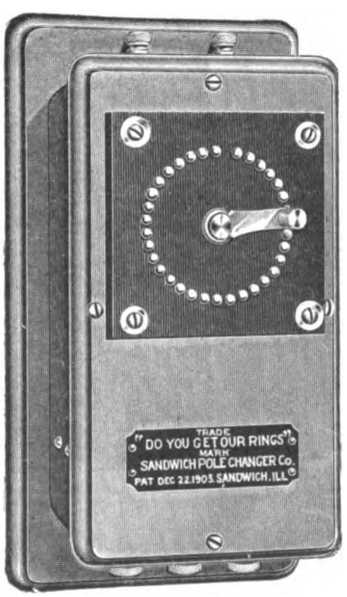
Let us make

3 Metallic Circuits Out of 2 Circuits

for you. You can divide your Metallic Circuits. You can give an Independent Circuit to one or more subscribers.

You Can

Increase Your Toll Lines 100 per cent.



THAT DUPLEX

These Duplexers are provided with a very simple but efficient

Balancing Device

A child can balance your lines instantly with this switch after your Duplexers are once installed.

You need not buy before being convinced of their true value We send our instruments on 30 DAYS' FREE TRIAL So you may know how much TIME and money they will SAVE you. Write and let us know your needs. We can do you a great amount of good for a small outlay of money.

SANDWICH POLE CHANGER COMPANY, 400 Eddy St., Sandwich, Ills.

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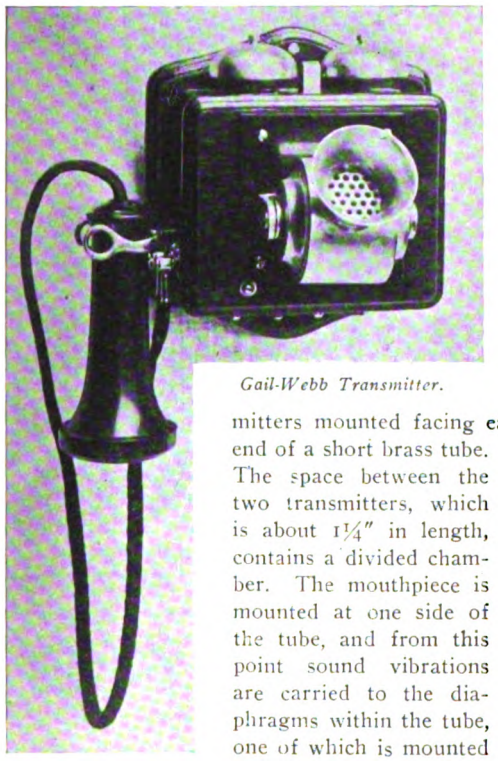
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

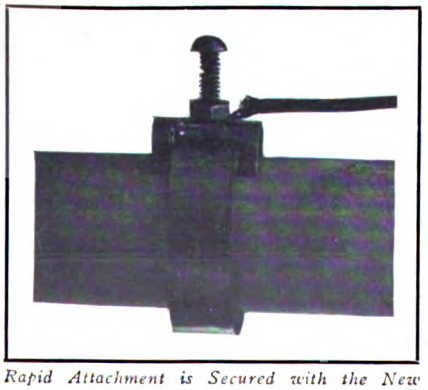
A NOVEL TRANSMITTER.

NOVELTIES in transmitter design which make an exceedingly unique instrument, which at the same time has several very practical advantages, are shown in the accompanying illustrations. The instrument is made by the Gail-Webb Manufacturing Company, 6-8 Lock street, Buffalo, N. Y. The transmitter itself is double; that is, it is not a single transmitter with two diaphragms, but two distinct and separate transmitters mounted facing each other at each end of a short brass tube. The space between the two transmitters, which is about 1¼" in length, contains a divided chamber. The mouthpiece is mounted at one side of the tube, and from this point sound vibrations are carried to the diaphragms within the tube, one of which is mounted near each end.

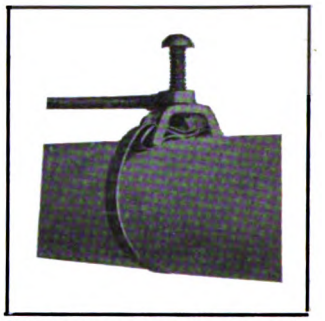


Gail-Webb Transmitter.

The transmitter as a whole is supported by means of trunnions concentric with the two diaphragms, which allow it to be rotated throughout nearly a whole circle. The current is conveyed to the electrodes by one of the trunnions, from which it passes to a corresponding transmitter, thence across to the other transmitter and out by means of the other trunnion. It will be seen that by this arrangement there is no breaking of the contact at the electrodes when the transmitter is turned and the diaphragm always remains vertical. At the same time the rotation of the instrument effectually prevents any possibility of packing of the carbon particles. The manufacturers make an interesting comparison to bring out this point, stating that the operation is very similar to turning a barrel of apples over onto its side, in which it is desired to keep the apples in contact with the two heads of the barrel to maintain the electric circuit. By rolling the barrel on its side the apples are always kept loose and can never pack. It is claimed that the transmitter has shown up very well in transmission tests, especially on long distance service, under very adverse conditions. It is said that the two diaphragms produce a natural tone and that there has been absolutely no trouble from packing.

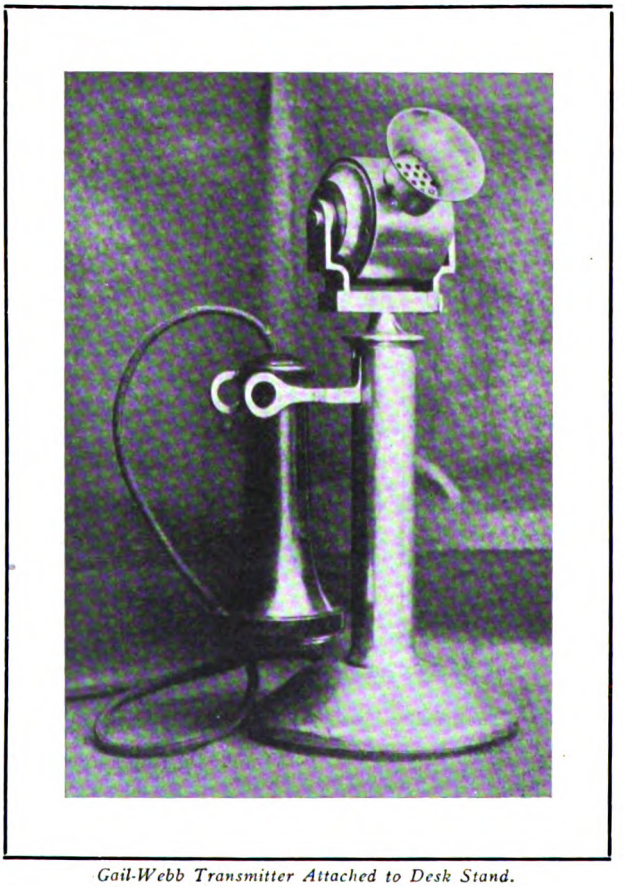


Rapid Attachment is Secured with the New York Ground Clamp.



Turning Down the Screw Draws the Strap Tightly Around the Pipe.

The instrument can be mounted upon any type of standard with very little expense, and the ability to turn the transmitter over enables it to be very conveniently used, as there is no need for picking up the stand and turning it around, thus causing the cords to twist. The manufacturers have recently incorporated under the name given above and the officers of the company are: Harry M. Gail, president and manager; Charles W. Webb, vice-president and secretary; J. W. S. Webb, treasurer. Further information regarding the efficiency of this instrument, prices, etc., can be obtained by writing to the company.



Gail-Webb Transmitter Attached to Desk Stand.

CLAMP FOR GROUND WIRE.

THE New York Ground Clamp, which we illustrate upon this page, is a device for connecting telephone and telegraph ground wires to pipes and cables. It is manufactured by the Yonkers Specialty Company, Yonkers, N. Y. The clamp consists of a strap of soft tinned copper in combination with a brass clamping plate of special form and a tightening screw. The latter is provided with a nut and washer, by means of which the ground wire is fastened tightly in position against the plate. In applying the device to a pipe the screw is withdrawn a sufficient distance to allow the strap to be passed across through the slot and pulled up until it is tight. The screw is then turned until the strap is drawn very tightly about the pipe and the instrument is then ready for the insertion of the

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Desdemona Sands Lighthouse Station, mouth of Columbia River, Oregon.
All timber, piling, dock, lumber, etc., was treated with Avenarius Carbolineum at the time of construction.
This lighthouse was erected in 1901 and at the present time shows no sign of decay, and no moss, fungus, barnacles or growth of any kind is attached to it.

Above cut is an example showing the high opinion U. S. Engineers have of

AVENARIUS CARBOLINEUM

Government Engineers at Charleston, S. C, Savannah, Ga., Chattanooga, Tenn., Rock Island, Ills., Manila, P. I., and dozens of other places, specify its use regularly for

WOOD PRESERVATION

AVENARIUS CARBOLINEUM is a heavy oil for superficial treatment of wood above or below ground to prevent against rot and decay. Applied with a brush, like paint, or by immersion of the timbers —one-third gallon to 100 square feet— it does not greatly increase cost. Always ready for immediate use. Brushes soaked in it will not harden. Has been and is successfully used by the

LARGEST TELEPHONE COMPANIES IN THE FIELD

both Bell and Independent, for

POLES AND CROSS-ARMS

Butt Ends, Gains, and Roofs of Poles can be successfully treated with AVENARIUS CARBOLINEUM at a cost not higher than the cheapest paints

WE GUARANTEE to double the natural life of POLES and CROSS-ARMS

ON THE MARKET SINCE 1875

Carbolineum Wood Preserving Co.

MILWAUKEE, WIS., AND PORTLAND, ORE.

BRANCHES AND WAREHOUSES: NEW YORK, SEATTLE, SAN FRANCISCO, NEW ORLEANS, ST. LOUIS, CLEVELAND, CINCINNATI

AVENARIUS CARBOLINEUM IS NOT COSTLY AND IT GOES A LONG WAY

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ground wire. The screw point bears on the strap.

It will be seen that this process is very rapid as compared with the alternative method of wrapping the wire many times around the pipe and soldering it. The company claims that practical service in connection with the lines of many large companies which have adopted it shows that it furnishes an extremely satisfactory ground connection at a very low expense. Further information will be sent upon receipt of a request.

THE NEW DEAN SWITCH HOOK LEVER.

SUBSTANTIAL construction and neat design characterize the new switch hook lever designed and manufactured by the Dean Electric Company, Elyria, Ohio. It is made by pressing and drawing it to the proper shape by numerous operations from one piece of heavy sheet brass.

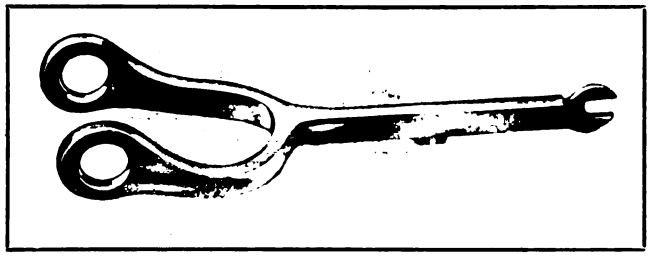

Fig. 3. The Dean lever when completed by the new process.

The number of operations required to form this hook compacts it in such a way as to close all the pores in the metal, thereby strengthening and hardening it so that when completed it has the appearance of a solid metal hook lever. Another point of value is in the strength of the lever at the body of the forks, as at this point more hooks are broken than any other place. It will be noted in the view of the second operation (Fig. 2) that this part of the hook lever is drawn up in the shape of a triangle so as to brace the prongs of the hook and insure great strength. The metal is doubled over, not only on the body of the lower but in both prongs, making the latter very rigid.

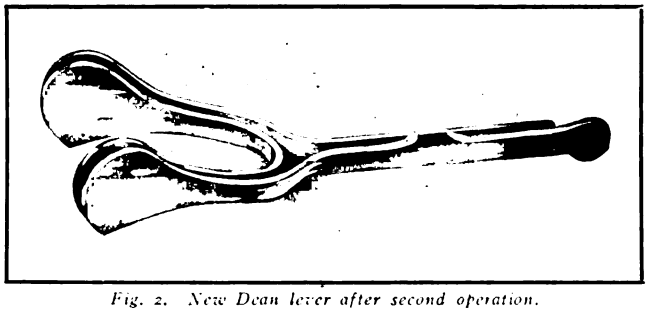

Fig. 2. New Dean lever after second operation.

The accompanying illustrations show the blank, the second operation and the completed hook. As the hook lever, when projecting from the side of a telephone, is subject to much damage in shipping, storage and handling, it is made removable in the Dean construction so as to be left detached until the instrument is mounted in position on the wall. This has the additional advantage of saving packing and storage space. The lever can only be removed by opening the lid of the telephone box, as the release is mounted on the body of the switch, thereby making the device fool proof.

Like all other novel Dean products, these features are protected by pending patent applications.

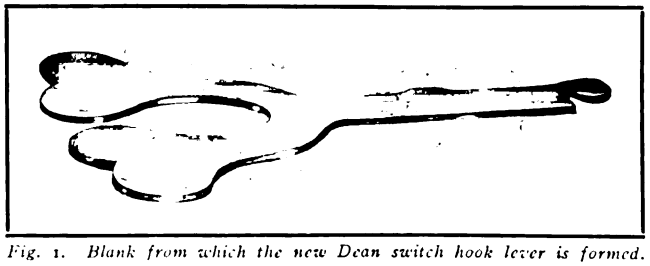

Fig. 1. Blank from which the new Dean switch hook lever is formed.

THE SAND POINT CEDAR COMPANY, Sand Point, Idaho, has a large stock of selected cedar poles on hand from which it can make prompt shipments. The timber handled by this company is claimed to be sound throughout and well seasoned. It is grown in a country which develops magnificent trees. All sizes are carried in stock, so that no delays can occur in securing specified lengths.

MERCURY ARC RECTIFIER OPERATING IN MULTIPLE WITH MOTOR GENERATOR.

THE Pacific States Telephone and Telegraph Company, of San Francisco, has a 40-ampere storage battery in use in its exchange at Alameda, Cal. Until recently this battery has been charged from an equipment consisting of a small direct current generator, driven by a single phase motor of only sufficient capacity to charge the storage battery at a rate of approximately 30 amperes.

This company had recently purchased a 20-ampere General Electric mercury arc rectifier outfit and installed it in the Alameda exchange in order to test it in commercial operation. The load on this exchange is so heavy, however, that if the battery were to be charged at only 20 amperes it would be necessary to keep the charging current on for twelve or fifteen hours per day. It was therefore determined to try to operate the rectifier in multiple with the direct current generator and charge the battery at the normal rate of 40 amperes. The generator was started up and thrown on the battery and the voltage adjusted to give about 10 amperes charging current. Next the rectifier was started in the usual way, adjusted to charge at about 20 amperes and thrown into parallel with the generator. The generator voltage was then raised until the current through the battery was 40 amperes and the charging proceeded.

As the electromotive force of the battery rose and the rectifier current fell off, due to the higher voltage of the generator, the voltage of the rectifier was raised by means of the rheostat at the bottom of the panel. The rectifier voltage could also be varied while the rectifier was operating by moving the compensating reactance switch, as the voltage of the generator kept the arc going while the switch passed over the dead points.

This scheme of operating the mercury arc rectifier in parallel with the generator has been in regular operation ever since it was first tried, and the attendants are very much pleased with it, as they are now enabled to charge the battery in three-quarters of the time previously required.

THE ELECTRIC CABLE COMPANY, of 42 Broadway, New York, has just received from the Bullock Electric Manufacturing Company, of Cincinnati, an order for the new insulating compound, Voltax, for impregnating field and armature coils.

It is claimed that tests which have recently been made of this compound by the Electrical Testing Laboratories of New York have shown that Voltax possesses all of the insulating properties of rubber and in many cases has withstood tests far more severe than rubber. As Voltax has no injurious effects upon copper it does not require tinning before applying the compound, as there is no corrosive action.

THE A. H. RANNEY CONSTRUCTION COMPANY, Mason City, Ia., is prepared to furnish estimates for building high grade exchanges, toll lines and farm lines. The company also furnishes skilled employees for telephone work.

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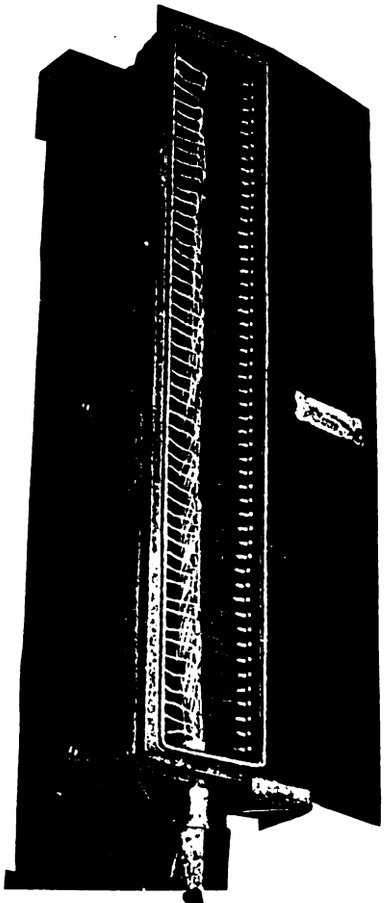

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FINANCIAL.

ULLIN, ILL.—The Ullin Telephone Company has increased its capital stock from $2,500 to $5,000.

BORDEN, IND.—The Farmers' Mutual Telephone Company has increased its capital stock from $1,000 to $5,000.

BAINBRIDGE, MICH.—The Bainbridge Telephone Company has increased its capital stock from $2,000 to $10,000.

THREE RIVERS, MICH.—The Three Rivers Telephone Company has increased its capital stock from $35,000 to $50,000.

HANSKA, MINN.—The Hanska Rural Telephone Company has declared a dividend of ten per cent.

MACDOUGALL, N. Y.—The MacDougall Telephone Company is to increase its capital stock from $5,000 to $20,000.

ADA, O.—The Ada Telephone Company has increased its capital stock from $100,000 to $125,000.

EATON, O.—The Eaton Telephone Company has increased its capital stock from $50,000 to $120,000.

SCANDINAVIA, WIS.—The Scandinavia Telephone Company has increased its capital stock from $1,500 to $3,000.

FRANCHISES.

LANGDALE, ALA.—The Langdale Telephone Company has applied for a franchise to extend its lines to West Point.

HELENA, MONT.—Men interested in The Home Telephone and Telegraph Company, of Portland, Oregon, are asking for a franchise at Helena.

HAMMONTON, N. J.—A franchise has been granted to the Hammonton Telephone & Telegraph Company to build a telephone line from Hammonton to the Mullica township line.

HAMILTON, O.—The Hamilton Telephone Company has applied for a franchise to operate a telephone system in Middletown.

WOONSOCKET, R. I.—The New England Shaver Telephone Company, of Providence, R. I., has filed an application for a franchise to operate in Woonsocket.

POMEROY, WASH.—The Automatic Telephone Company has applied for a franchise at Pomeroy.

McLEOD, ALBERTA, CANADA.—The town is applying to the Legislature for powers to build, maintain and operate a municipal telephone system. Address C. H. Baker.

COMBINATIONS.

CHARLESTON, ILL.—The Kinloch Telephone Company, of St. Louis, Mo., has about closed negotiations for the purchase of the plant of the Charleston Telephone Company.

CRESTON, ILL.—The Ogle Co. Telephone Company is to connect its lines with the Tri-Company's lines at Creston.

TABOR, IA.—The City Telephone Company, owned by Bell Bros., has been sold to J. W. Wayrock, of Leavenworth, Kas., on a basis of $57,000.

ELECTIONS.

POMONA, CAL.—The Pomona Valley Telephone & Telegraph Company has elected the following directors: F. W. Thomas, J. Albert Dole, D. S. Parker, C. E. Walker, G. W. Ogle, L. A. Lorbeer and A. M. Dole.

CARBONDALE, ILL.—The Ohio & Mississippi Valley Telephone Company has elected the following officers: President, Ed. Sampson, Anna; vice-president, H. C. Miller, DuQuoin; secretary, F. W. Willard, Anna; treasurer, D. M. Parkinson, Carbondale.

WOOLSTOCK, IA.—The Woolstock Telephone Company has elected the following officers: President, C. H. Clifton; secretary, J. W. Watkins.

HUMBOLDT, NEB.—The Speiser Rural Telephone Company has elected the following officers: C. Lionberger, president; R. F. Conrad, secretary and treasurer.

NEW COMPANIES.

PHOENIX, ARK.—The Consolidated Telephone, Telegraph & Electric Company is to considerably improve its system between Phoenix and Prescott. In California the company is also constructing long distance lines from Imperial to Calexico.

ANDERSON, CAL.—An Independent telephone company has been formed to build a line from Anderson to Orlinda.

PAYETTE, IDAHO.—The Payette Valley Independent Telephone Company contemplates many improvements to its system, among which will be the installation of new exchange apparatus in its new telephone building at Payette. The company will also build a line to New Plymouth.

SAINT ANTHONY, IDAHO.—The Fremont County Independent Telephone Company, with its principal place of business at Saint Anthony, has been incorporated with a capital stock of $5,000. The principal stockholders are the Highland Ranch Improvement Company, William Vanderveer, More & Fuller, G. E. Bowerman, A. C. Langley, George Harrigfield and C. P. Bartlett.

BUSHTON, ILL.—The Seven Hickory and Morgan Township Mutual Telephone Company, at Bushton, has been incorporated with a capital stock of $3,500. The incorporators are as follows: H. Z. Ohair, H. Brown and E. H. James.

FAIRVIEW, ILL.—The Fairview Southwestern Telephone Company, Fairview, has been incorporated with a capital stock of $1,000. Incorporators are Jerome Lawson, Thomas H. Travers and J. E. Barlow.

MARSEILLES, ILL.—The Marseilles Telephone Company has been reorganized with the following directors: M. E. Blanchard, F. T. Neff and A. C. Allen, of Marseilles, and N. C. Richardson and E. H. Moulton, of Minneapolis.

MOUNT TABOR, ILL.—The Mount Tabor Telephone Company has been organized at Mount Tabor with a capital stock of $2,500. Incorporators: Albert Stewardson, J. W. Fleming and Levi Mortz.

RINARD, ILL.—The People's Telephone Company, of Rinard, Ill., has been incorporated with a capital stock of $10,000. The incorporators are J. W. Zimmerman, William Hunt and Isaac Smith.

CHARLOTTESVILLE, IND.—The Charlottesville Northern Telephone Company, Charlottesville, Ind., has been incorporated with the following incorporators: R. S. N. Oldham, C. W. Ramsey, W. R. Johnston.

FLAT ROCK, IND.—The Flat Rock Telephone Company has been reorganized.

TOBINSPORT, IND.—The Tobinsport Telephone Company, Tobinsport, Ind., has been incorporated with a capital stock of $1,000. The incorporators are Quimtilian K. Groves, John C. Esaray and David White.

BATAVIA, IA.—The Batavia Telephone Company, Batavia, Ia., has been incorporated with a capital stock of $25,000. Incorporators: A. V. Beeman and others.

BELLE PLAINE, IA.—The Belle Plaine Mutual Telephone Company has been organized with the following officers: S. A. McCandless, president; C. W. E. Snyder, secretary; Alex. Calvert, treasurer.

GRAFTON, IA.—The Grafton Telephone Company, of Grafton, Ia., has been incorporated with a capital stock of $10,000. The incorporators are Henry J. Tesch and others.

HOLLANDALE, IA.—The Hollandale Mutual Telephone Company, of Hollandale, Winnebago County, has been incorporated with a capital stock of $2,500. S. O. Holland and others incorporators.

PACIFIC JUNCTION, IA.—The Pacific Junction Mutual Telephone Company has been formed with the following officers: John Mulvihill, president; C. F. Anderson, secretary; Charles Kroon, treasurer.

ATHOL, KAS.—The People's Telephone Company, Athol, Kas., has been incorporated with a capital stock of $5,400.

LIBERAL, KAS.—The Liberal-Hugoton Telephone Company has been incorporated with a capital stock of $415.00.

OSAGE CITY, KAS.—The Osage City Telephone Company has been organized with a capital stock of $12,000.

PARSONS, KAS.—The Prairie Telephone Company has secured a New Jersey charter recently to construct and operate telephone lines outside of the State. The capital stock is $200,000, and the incorporators are James A. Plotner and C. M. B. Chase, both of Kansas City, and Fred H. Brown, of Parsons, Kas.

RUSH CENTER, KAS.—The Rush Center Telephone Company, of Rush Center, Kas., has been organized with the following officers: President, W. C. Holmes; vice-president, C. L. Black; secretary, Frank U. Russell; treasurer, C. H. Lyman.

WEST PLAINS, KY.—The Clark's River Telephone Company, West Plains, Graves Co., Ky. (Post Office Hickory Grove), has been incorporated with a capital stock of $3,000. The incorporators are J. W. Davis, W. R. Allen and R. Y. Wilkerson.

FORT KENT, ME.—The St. Francis Telephone Company has been organized at Fort Kent with a capital stock of $5,000. It will build and operate telephone lines in Aroostook County, connecting with the lines of the Fort Kent Telephone Company. The officers of the company are: Frank W. Mallett, of Fort Kent, treas.; J. J. Wheelock, president.

DECKERVILE, MICH.—The Farmers' Telephone Company has been incorporated with a capital stock of $2,000.

PORT SHELDON, MICH.—The Port Sheldon & Lake Shore Telephone Company has been organized with a capital stock of $2,000.

LAMBERTON, MINN.—An Independent telephone company has been formed at Lamberton with the following incorporators: Albert H. Enerson, L. Redding and George J. Grimm.

EXCELSIOR, MO.—An Independent telephone company has been formed at Excelsior. The incorporators are Messrs. Sisson, Bradley, Turner and Beshears.

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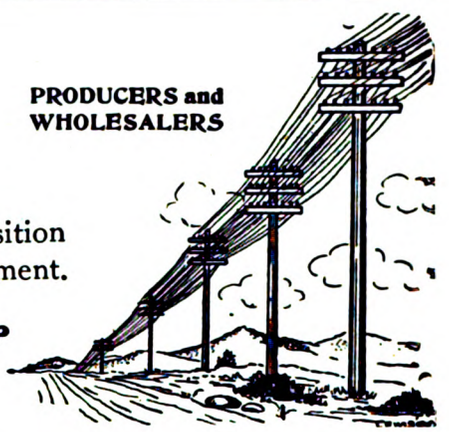

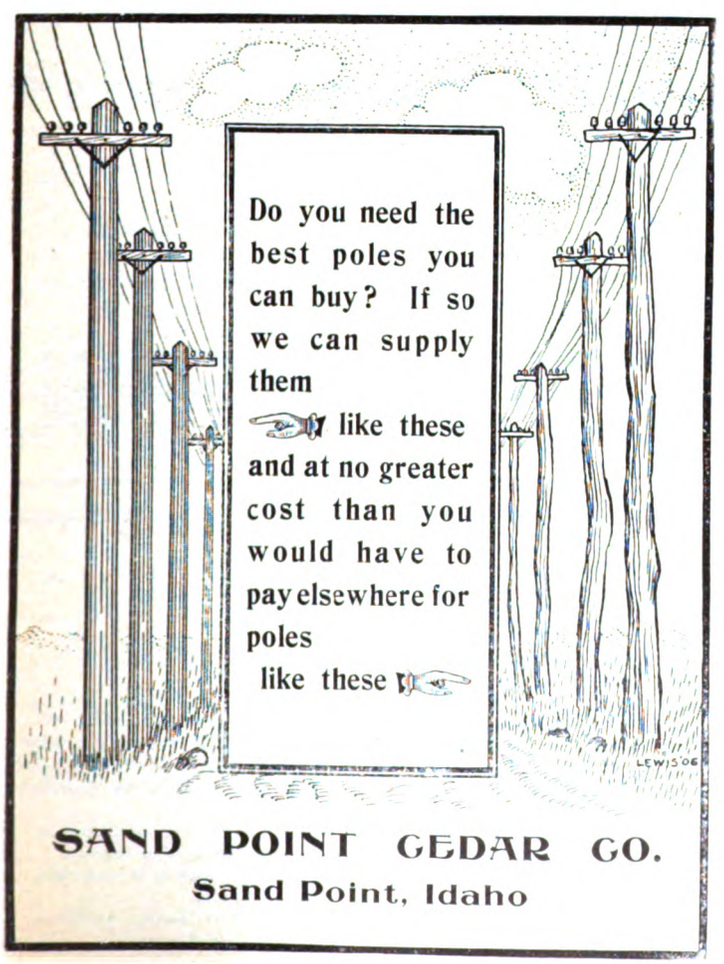

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THE WEEK'S MESSAGES

BUTTE, MONT.—The Montana Independent Telephone Company has been formed at Butte, Mont. The company will be capitalized at $2,000,000. The following is a list of the parties backing the company: F. Augustus Heinze, Charles R. Leonard, Charles J. Kelly, D. J. Hennessy, H. A. Galloway, Henry Muhler, Herbert B. Brown and F. W. Moss, of Billings. Elmer B. Jones, managing director of the Independent Telephone Company, Salt Lake City, Utah, is interested.

LAWRENCE, NEB.—The Lawrence Telephone Company has been incorporated at Lawrence, Neb.

STEELE CITY, NEB.—The Steele City Telephone Company has been incorporated with a capital stock of $15,000.

THURSTON, NEB.—The Farmers Independent Telephone Company has been incorporated with a capital stock of $7,000.

EXETER, N. H.—The People's Telephone Company, of New Hampshire, has been incorporated with the following incorporators: Warren Brown, Hampton Falls; W. M. Batchelder, Hampton; Geo. A. Carlisle, Augustus Young, Exeter; D. J. Bakie, Kingston. The company will build lines in Exeter, East Kingston, Kingston, Kennington and Hampton, at which places it has secured franchises.

EAST HOMER, N. Y.—The People's Telephone Company has been formed, and will build lines from East Homer through Truxton, Cuyler, Keeney Settlement to Fabius. The new company will have its long distance connections through the Inter-Ocean Telephone & Telegraph Company's toll exchange in Cortland.

FREETOWN CORNERS, N. Y.—The Freetown Telephone Company, Freetown Corners, N. Y., has been incorporated with a capital stock of $2,000. The incorporators are D. B. Smith, B. Hall and Wilber Car, all

OBERON, N. D.—An Independent telephone company has been formed at Oberon, with W. C. Schaffner as president.

OKOLONA, O.—The Farmers' Mutual Telephone Company, of Okolona, has been incorporated with the following incorporators: F. H. Heilman, Isaac F. Durham and others.

THURSTON, O.—The Buckeye Lake Home Telephone Company, of Thurston, has been incorporated with a capital stock of $10,000. The incorporators are W. F. O'Gara, H. C. Chapin, W. R. Nutt, W. G. Palmer and H. J. Brown.

TOLEDO, O.—The Erie Construction Company, of Toledo, has been incorporated with a capital stock of $10,000. The incorporators are James E. Brailey, of the Toledo Home Telephone Company; H. P. Yeager, A. F. Hanson, W. E. Cordill and John C. Newton. The company is to construct telephone lines.

CARTWRIGHT, MAN., CANADA.—The Mather Co-operative Telephone Company has been formed with the following officers: President, T. E. Elliott; vice-president, H. McLean; secretary-treasurer, D. B. McKinnon. The company will commence construction of its lines at once.

HOLLANDALE, WIS.—The Perry-Hollandale Telephone Company, of Hollandale, Iowa County, has been incorporated with a capital stock of $3,000. Incorporators: C. T. Paulson, John Swenson and others.

MEDICINE HAT, ALBERTA, CANADA.—The Alberta South Eastern Telephone Company has been formed at Medicine Hat with the following directors: W. C. Harris, secretary of the Board of Trade; S. T. Fawcett, William Rutherford, George Henry and W. Nicholls. The company will at once build lines to Cypress Hills, a distance of 50 miles. W. C. Harris, secretary of Medicine Hat Board of Trade, will furnish particulars.

MISCELLANEOUS.

BESSEMER, ALA.—At a meeting of farmers, held at Johns, steps were taken to consolidate the shareholders in two mutual lines to form the Oak Grove and Johns Telephone Company. The object of the company is to operate a system connecting up the entire south end of the county and Sumter, Johns and Adger. Arrangements have been made with the People's Home Telephone Company to enter this city and connect with Birmingham over their line. D. W. Houghton was elected president of the company.

NEW ULM, MINN.—Rural residents are making such urgent demands for service in this vicinity that the New Ulm Rural Telephone Company is preparing to rush extensions of its system. The capacity of the switchboard will be increased to accommodate new business.

HIAWATHA, NEB.—Representatives of mutual telephone systems at Huron, Brenner, Bedena, Leona, Robinson, Willis, Powhattan, Fairview and Hamlin, in Kansas, and Preston and Salem, in Nebraska, met at Hiawatha Monday, March 5. A temporary organization was formed with these officers: President, Frank Shaw, Hiawatha; secretary, W. H. Grush, Salem, Neb.; treasurer, G. W. Karrenbrock. Another meeting has been called for April 5 at Hiawatha, when a permanent organization will be effected.

BENTON RIDGE, O.—The Benton Ridge Mutual Telephone Company, which already connects with twenty-three city exchanges, is planning arrangements which will enable it to greatly extend its toll line facilities.

BELMONT, W. VA.—The Belmont Telephone Company and the Union Telephone Company have arranged that their subscribers may have free service over the two lines for the following places: Bethesda, Barnesville, Mt. Olivet, Morristown, Hendrysburg and Belmont, with Bethesda as the exchange for the circuit. The Union Company has a system in the following places: Morristown, Hendrysburg, Fairview, Little Washington, Freeport and Piedmont.

PERSONAL.

J. E. HANNON, formerly district contract agent for the Northwestern Telephone Company, has been promoted to the position of manager of the exchange at Faribault, Minn.

C. D. HENRY has been appointed manager of the exchange of the Southwestern Telephone Company at Van Buren, Ark.

W. A. MILLER, of Harrisburg, Pa., has been appointed manager of the Manchester branch of the American Telephone and Telegraph Company.

D. W. MOORE, of Oil City, has been elected manager of the Petroleum Telephone Company's plant at Titusville, Pa.

W. R. POLLOCK, of Elyria, has taken the management of the Home Telephone Company in Piqua, O.

J. T. RICE, formerly manager of the Southwestern Telegraph and Telephone Company at Austin, has been appointed manager of the exchange at Houston, Tex.

JOHN W. SLIPP has been appointed manager of the Birdsboro, Pa., district for the Conestoga Telephone Company.

New Construction in the Field

PERRIS, CAL.—The Home Telephone Company, of Redlands, is to establish an exchange at Perris.

RUSSELLVILLE, ARK.—The Russellville Telephone Company is making many improvements in its system.

LAKE FORK, ILL.—The Lake Fork Telephone Company is to build a line to Elkhart.

TOLEDO, IA.—The Toledo Commercial Telephone Company is soon to install a modern switchboard and put up 5,000 ft. of new cable.

ELIZABETHTOWN, KY.—The Hardin County Telephone Company, of Elizabethtown, is putting in a new metallic line to Hodgenville. The company also contemplates other extensions.

OWENSBORO, KY.—The Rural Telephone Company, which recently increased its capital stock from $25,000 to $50,000, contemplates many improvements to its system. The increased capital has been provided for the extension of the connections of the company, with especial reference to long distance business.

DENTON, MD.—The Farmers' & Merchants' Telephone Company is to build a line in Talbot, and is also to build lines to Hobbs and Andersontown.

COURTLAND, MINN.—The New Ulm Rural Telephone Company is to extend its lines in Courtland.

MORRILL, MINN.—The Morrill Telephone Company expects to extend its lines to Pierz and Mille Lacs.

HARRISBURG, PA.—The United Telephone Company, of Harrisburg, is to build lines between Altoona and Bedford.

SCRANTON, PA.—The Consolidated Telephone Company is making many improvements in its system, both at Allentown and Hazleton, as well as in Scranton.

BLANCO, TEXAS.—The Martin Telephone Company, of Llano, is putting in an exchange at Blanco, and will build a line to Kendalia.

NEWPORT, TEXAS.—The Independent Telephone Company is building a line from Newport, Texas, to Jacksboro.

OPEQUON, VA.—The Opequon Telephone Company is to build a line to Mountain Falls.

WILDING, W. VA.—The Wilding & Medina Telephone Company is building a line to Elizabeth.

BURLINGTON, WIS.—The Burlington, Brighton & Wheatland Telephone Company, which recently increased its capital from $5,000 to $10,000, intends to construct many new lines, as well as to improve its present system.

ROSENDALE, WIS.—The Rosendale, Springvale, Eldorado and Rogersville Telephone Company, of Rosendale, is to extend its lines to Ripon.

WALWORTH, WIS.—The Walworth Telephone Company is to materially improve its system around the west end of Geneva Lake.

SWIFT CURRENT, SASKATCHEWAN, CAN.—J. T. Booher, of Houston, Texas, is to install a local telephone system at Swift Current.

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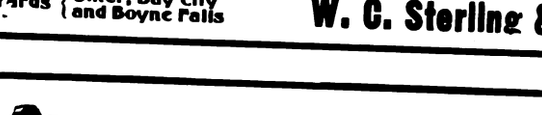

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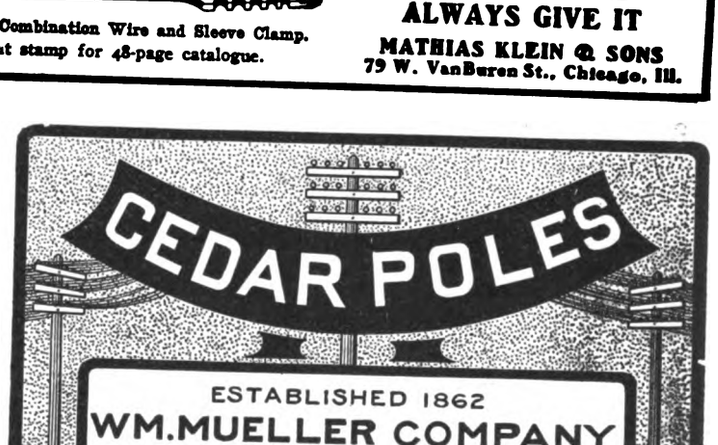

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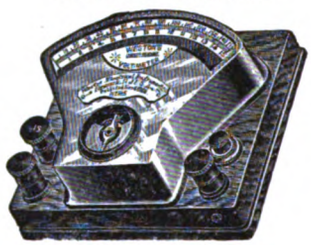
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Toll Tickets, Toll Station Journals, Toll Station Ledgers, Receipts for Toll Service, Monthly Check Reports, Coupon Books, Stock Certificates, Lease and Rental Records, Cash Books, Trouble Tickets, Rental Receipts, Voucher Checks, Exchange Directories, Fine Stationeries, Special Forms of All Kinds.
Write for Sample Forms and Prices.
THE TELEPHONE PRINTING CO.
DEFIANCE, OHIO

The Celebrated
DONNELLY CLIMBER
is made of the toughest and best steel obtainable. It is guaranteed not to break. You can trust your life to it with perfect safety.
The Donnelly climber is now made exclusively by
The Blakeslee Forging Co.
PLANTSVILLE, CONN.
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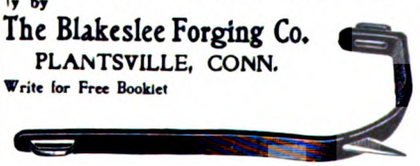

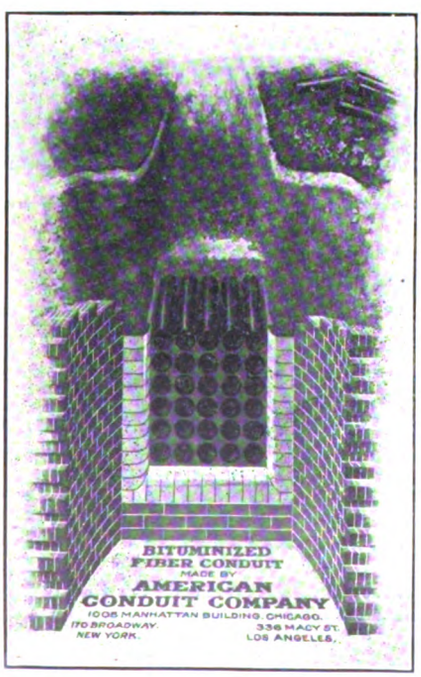

TELEPHONE & TELEGRAPH WIRE
HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
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"EXTRA BEST BEST" (E.B.B.). "BEST, BEST" (B.B.). "STEEL"
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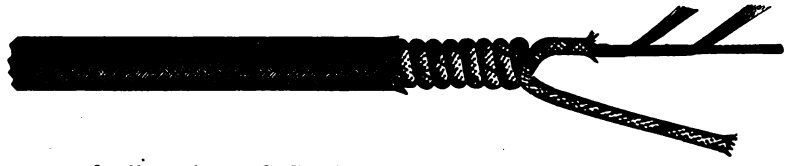
Cord Troubles Are Past if You Use the "EACO" STEEL SWITCHBOARD CORD



The general appearance of all makes of Cords are about the same, but when quality is taken into consideration there is a vast difference. "Eaco" Steel Switchboard Cords have the quality and give the service Exchange Managers are looking for. Our prices are right, our Cords are right. Send for sample.

ELECTRIC APPLIANCE COMPANY, Chicago, Telephone Manufacturers

BRANCHES: SAN FRANCISCO, DALLAS, NEW ORLEANS

Perfect, Permanent Contact between Conducting Frame and Active Mass

is a notable feature of the Gould Plate. For excellent retention of initial capacity, for high watt-efficiency, for long "life" and for the greatest return on the money invested, the Gould Storage Battery stands pre-eminent.

It will pay you to investigate the many good points of the Gould cell. Send for the Gould Bulletins.

SALES OFFICES
Boston—89 State St.
Chicago—Rookery Bldg.
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QUALITY IS OUR POLICY

MAKERS of TELEPHONES

EVERYTHING ELECTRICAL

You do not have to pay a fancy profit to anyone when you buy

WESCO Telephones

We consider our telephones more in the nature of an advertisement for our supply business (the largest of its kind in the U. S.) than as a means of direct profit, and can therefore afford to put more real value into them and sell them at a smaller margin of profit than the exclusive telephone manufacturer can possibly afford to do.

Send for booklet and be convinced. Send for samples and you will be sure of it.

WESCO THE WESCO SUPPLY CO. WESCO

FT. WORTH, TEX. ST. LOUIS, MO.

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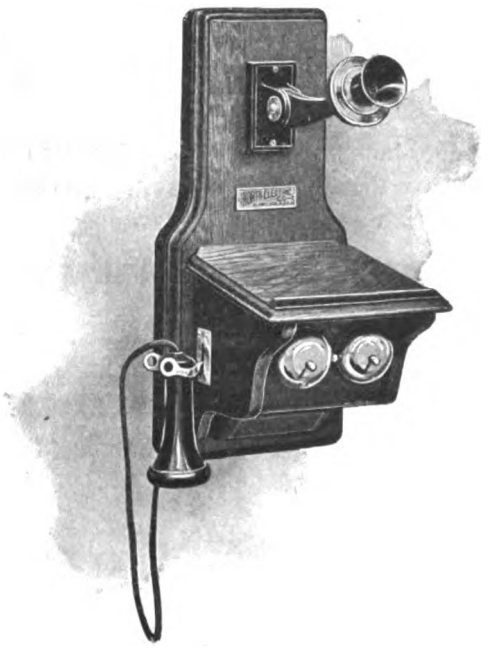
NORTH COMMON BATTERY TELEPHONES



The hinged front of "NORTH'S" common battery wall type telephone renders the condenser and instrument wiring accessible without removing from the wall.

The cabinets are not veneered, but every stick of lumber is from a veneered mill; for they handle nothing but the most beautifully figured woods. The stock is 18 months old, kiln dried 30 days and given a hand-rubbed finish involving 7 processes.

They are equipped with the following standard parts, and will operate on any standard common battery system.

"NORTH'S" Solid Back Transmitter that combines ample volume, perfect articulation, deep penetration and natural pitch.

"NORTH'S" Permanently Adjusted Receiver. The diaphragm does not rest on the outside shell, but on a bell-shaped metal seat—it isn't thrown out of adjustment by unequal expansion of hard rubber and magnet metal.

"NORTH'S" New Ringer, provided with a knife-edge, weighing-scale bearing armature—it can't tighten or drop out of place.

"NORTH'S" Horizontal Lever Adjustable Tension Switchhook with long flexible contact springs—they can't break or become misplaced, and always resume their normal positions.

The parts are individually tested—the transmitter by an engineer. There are two inspections during assembling, a final test on completion and again a test before shipping—just to make sure.

THE NORTH ELECTRIC CO.

CHICAGO CLEVELAND DALLAS

AKRON, Ohio—
OAKLAND, California—
TACOMA and
BELLINGHAM, Washington

have all gone Automatic—Akron for 3,000 lines, Oakland for 5,000, Tacoma for 4,000 and Bellingham for 1,000.

Merit, absolute merit, was the reason why Automatic Telephone Equipment was selected by the Independent Companies in these cities.

They wanted the best, the very best, in telephone equipment.

They took their time and looked hard for it everywhere.

They found it in the Automatic.

That's where you will find it when you are ready to see it.

That's where the Independent Companies in all these cities found it—they adopted the Automatic:

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Portland, Me.
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Lewiston, Me.
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Aberdeen, S. D.
Miamisburg, Ohio.
Los Angeles, Cal.
Portland, Ore.
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Battle Creek, Mich.
Clayton, Mo.
Pentwater, Mich.
Toronto Junction, Canada.
Wilmington, Del.

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Traverse City, Mich.
Auburn, Maine.
Fall River, Mass.
New Bedford, Mass.
Medford, Wis.
San Diego, Cal.
Hopkinsville, Ky.
Hazleton, Pa.
Woodstock, N. B.
St. Marys, Ohio.

Westerly, R. I.
Manchester, Ia.
Princeton, N. J.
Riverside, Cal.
Allentown, Pa.
Hastings, Neb.
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El Paso, Texas.
Havana, Cuba.
Marianao, Cuba.
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AUTOMATIC ELECTRIC COMPANY
Van Buren and Morgan Streets, CHICAGO, U. S. A.

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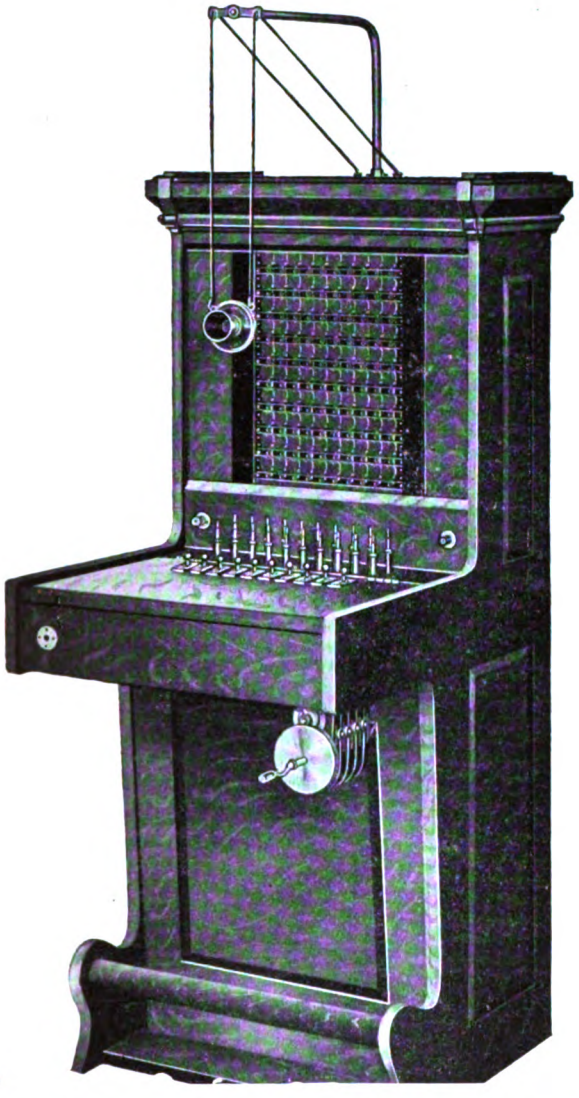
CENTURY

100 % GOOD



PERFECT MAGNETO SWITCHBOARDS

If you are in the market for a new magneto switchboard and wish to give your subscribers the very best service, at the same time reducing your maintenance expenses, it will be to your interest to use a CENTURY switchboard.

Every detail in our switchboards is carefully designed and constructed so as to eliminate all possible chances for trouble.

All parts are so made that they can be readily removed and replaced.

We would like to send you sample drops, jacks and other parts for your inspection, which we will do, charges prepaid. We hope that when you are in the market you will allow us to submit prices to you.

We have a four party selective system that is applicable to any size of magneto exchange.

This system is entirely different from any other in the market.

It has been thoroughly tested and found to be the most practical and economical of any in the market at the present time.

Write for particulars.

CENTURY TELEPHONE CONSTRUCTION CO.

332 ELLICOTT STREET

BUFFALO, N.Y.

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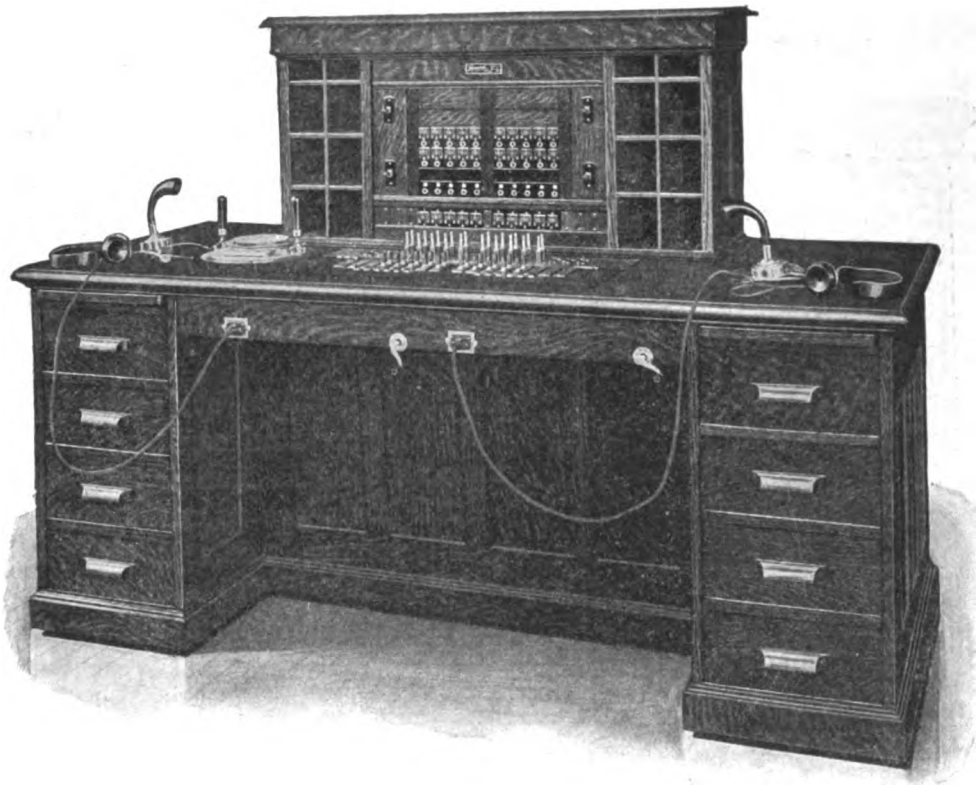
MONARCH APPARATUS

TOLL BOARDS



The Monarch drop is especially adapted to toll work. It is sensitive and efficient, and the armature adjustment feature insures a distinct signal on every line. We make all types and sizes of toll boards, and are prepared to embody the latest circuits and ideas of operation. The illustration above shows a two position board with a capacity of forty toll lines, twenty transfers, sixteen cord circuits and two operator's sets. Write for full description of our toll boards. The apparatus is good. The prices are reasonable.

MONARCH TELEPHONE MFG. CO.

10-16 So. Clinton Street, - CHICAGO, ILL.

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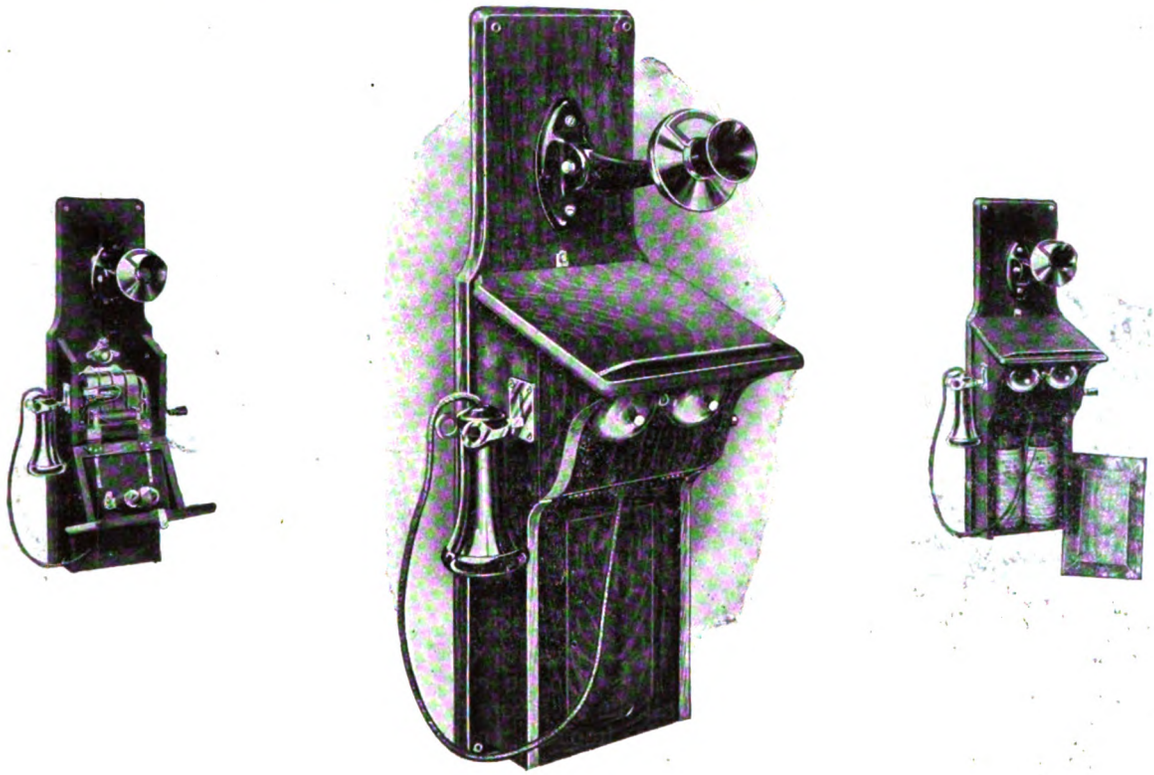
DEAN TELEPHONE APPARATUS



Our Number Fourteen-Twenty Type Telephone, shown in the accompanying illustrations, is a complete magneto local battery instrument, housed in the so-called common battery magneto type cabinet. These telephones are exceptionally neat in design, the woodwork is of the best seasoned quarter sawed oak or walnut carefully put together so as to keep its shape. The cabinet has two compartments for concealing the apparatus, each being separately opened for inspection or repairs, as shown in two of the accompanying illustrations.

The talking equipment—the vital part of a telephone, is the best that can be had, consisting of the celebrated Dean transmitter, receiver and induction coil. The current consumption of this talking apparatus is as small as practical for the best long distance transmission, in fact, so small that two dry cells will give the maximum results for a period of from one and a half to two years' service.

As regards economy and high quality, the Dean telephones are approached by no other so far devised, having achieved a record hitherto unparalleled in the history of the telephone business.

For further information write for our new 8 x 10 inch bulletin No. 101-A which illustrates and describes our complete line of local battery telephones.

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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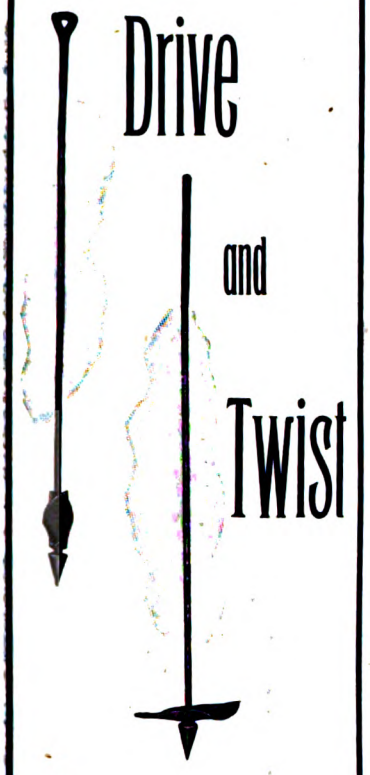
OUR FREQUENCY POLE CHANGER FOR SMALL 4-PARTY LINE MAGNETO AND COMMON BATTERY EXCHANGES WILL BE ON THE MARKET SOON. Come and see it in operation at our Factory.

Kellogg Philosophy . . .



Drive and Twist

Installed in 60 Seconds

Pulls on SOLID DIRT

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Specially Designed for STONY SOIL

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Made of Malleable Iron in Five Sizes

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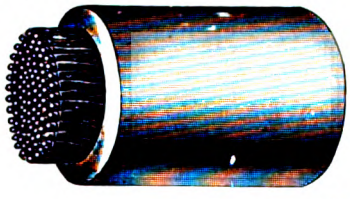
No. 3— "	¾" x 7'	"	8" x 18"
No. 4— "	1 " x 8'	"	10" x 22"
No. 5— "	1¼" x 9'	"	12" x 30"

We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

TOLEDO, O.

Cables, Paper and Rubber



THE F. BISSELL COMPANY.

TOLEDO, O.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK

"They Never Pull Up"

THE MILLER ANCHOR CO.

Norwalk, Ohio, U. S. A.

Elmer P. Morris Co.

51 DEY STREET - NEW YORK

Eastern and Export Agents

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PATENTS ADJUDICATED

United States Circuit Court for the District of Indiana confirms title of protector patents in the

STERLING ELECTRIC CO.

Cases of Frank Cook vs. Sterling Electric decided in favor of Sterling. Goods manufactured by Cook under these patents are infringements and must be accounted for to the Sterling Electric Co.

PURCHASERS BEWARE

of infringing protective devices. Our title is adjudicated. We shall now protect our rights and ask an accounting from all infringers.

INVESTIGATE THE CLAIMS

of the following patents: 428,564, 433,682, 658,976, 704,439, 707,049, 707,050, 711,921.

ALL COMBINATIONS

of carbon and fuse or carbon and heat coils we control. Read these two claims.

"In an electrical cut-out the combination with two opposed conducting surfaces situated in close proximity to each other of the interposed insulating material, maintaining said surfaces positively apart and having an opening through it, substantially as set forth.

"The combination of a line or metallic circuit, including instruments to be protected, a circuit opening device wholly included in each limb of circuit, a shunt around the instrument attached to each limb of the circuit, said shunt including electrically separate terminals operative by a definite rise in potential before operation of the circuit opening device substantially as described."

STERLING ELECTRIC CO.

LA FAYETTE, IND.

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OUCH

We have 500 Kellogg Central Energy Telephones in A1 condition for Quick Buyers, used only six months, for $5.00 each. Every one guaranteed. ¶ Will have for future delivery 2,500 Stromberg-Carlson Telephone Mfg. Co.'s Central Energy Telephones, almost new, at the same price. ¶ Before buying a switchboard write for our New Bulletin and Prices.

THE EDISON TELEPHONE CO.

Successors to Guarantee Tel. and Equip. Co.

60-68 West Van Buren Street

CHICAGO, ILL.

THE STANDARD

"HEMINGRAY"

All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.

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Established 1848

YAH

THEY TALK AS WELL IN GERMAN AS IN ENGLISH

WE ARE TALKING TO YOU FROM CHICAGO

WE WANT TO TELL YOU

THE

FARR TELEPHONE & CONST. SUPPLY CO.

118 and 120 W. Jackson Blvd.

CHICAGO

CAN SAVE YOU MONEY

SEND FOR OUR CATALOGUE

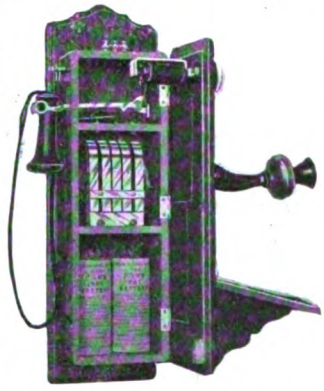
AND PRICES ON TELEPHONES, SWITCHBOARDS, LINE CONSTRUCTION MATERIAL AND LINEMEN'S TOOLS.

WE MAKE IT A BUSINESS.

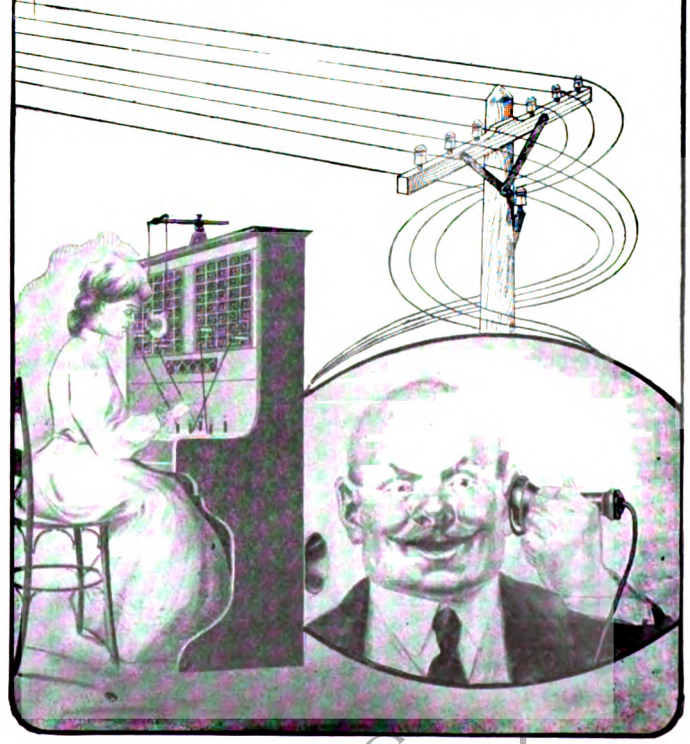
SUPPLYING THE TELEPHONE TRADE FOR THE PAST 10 YEARS.

WE WILL OPEN AN ACCOUNT WITH YOU AND SHIP YOUR ORDER SAME DAY RECEIVED.

SEND FOR ONE OF OUR EXCHANGE OR TOLL LINE TELEPHONES ON 30 DAYS' TRIAL. RETURN AT OUR EXPENSE IF IT DON'T SUIT.



No. 14 Bridging Telephone



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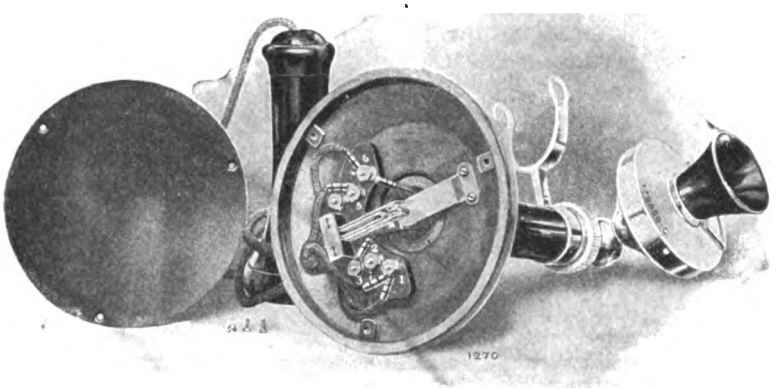
Ever Picture in Your Mind a Perfect Desk Telephone?

Most Telephone Men Have

Doesn't this one come the nearest to your ideal of any you ever saw before?

Could it be more attractive or simple? The finish will not show wear.

There is nothing about it to get out of order. No complicated parts.



Note arrangements of apparatus in base. The hookswitch is so simple and mounted so firmly that it couldn't get out of order.

The simplicity of that transmitter arm makes it attractive.

Better let us send you our Bulletin, describing this telephone more fully, and quote prices on your requirements.

Remember delays pay no dividends.

Stromberg-Carlson Tel. Mfg. Co.

General Offices
Rochester, N. Y.

Branch Sales Office
Chicago, Ill.

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WE MAKE CABLE

Cable Construction by One Who Knows

We append below a letter from C. H. Judson which we know will carry more weight than any arguments we could set forth relative to the merits of cable construction.

MR C. H. JUDSON.

Mr. Judson's ability and judgment is well proven from the fact that he has been engaged by the following prominent Independent companies as construction engineer:

Twin City Telephone Co.	**Minneapolis and St. Paul, Minn.**
Kansas City Home Telephone Co.	**Kansas City, Mo.**
Mutual Telephone Co.	**Des Moines, Ia.**
Independent Telephone Co.	**Council Bluffs, Ia.**

and is at present acting in a similar capacity for the

Independent Telephone Co.	**Seattle, Wash.**

Mr. Judson says:

THE INDEPENDENT TELEPHONE CO., COUNCIL BLUFFS, IA.

COUNCIL BLUFFS, IA., May 24, 1905.

STROMBERG-CARLSON TELEPHONE MFG. CO., Rochester, N. Y.

Gentlemen:—In Des Moines, with an average of 1,100 operating lines, in the cable plant during the month of February, 1905, the actual cases of line trouble were 11; six of them being blown fuses and the balance various other troubles.

Of course this was a very rare month, but it shows how much line trouble can be reduced by enclosing all the line wires in cables.

The short open wire plant, which includes the short lines attached to the end of the cables where they run out through from one to four blocks, with one or two pairs, gave considerably more trouble than this, although there were probably less than 100 lines in this part of the plant.

Theoretically the only line trouble that a cable plant can produce is caused by actual damage to the lines, as burning of the cables or the breaking of the cables from extraordinary causes, or the breaking or accidental grounding of the rubber covered drop wires.

Another plant in which there were about 1,800 all cable lines working, showed during a very heavy storm about one-fifth as much line trouble as an absolutely new open wire plant of somewhat smaller size, in the same vicinity.

The situation can be figured out by any Exchange Manager if he will take his trouble sheet and sort it up carefully, setting out in one column the cases of trouble which occur in lines which are all cable, and in another column those which occur on open wire lines.

Very truly yours,

(Signed) C. H. JUDSON.

Have you a copy of our Cable Booklet? Ask for Booklet No. 79-B.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N.Y. CHICAGO, ILL.

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INDIVIDUALITY

There are two kinds of individuality; that which means originality of conception and design without departure from that which is considered good practice; and that which stands for construction that is different from anything else without any improvements to recommend it.

An examination of the **Swedish-American** apparatus, illustrates the fact, that it is possible to depart from the old ruts into which telephone designers have fallen.

It will be found that all parts of their telephone are different from any others, but at the same time a definite advance in the art of telephony has been made.

Have you ever noticed the general similarity in the apparatus of all other makers? One might suppose that the ultimate goal had been reached and that there could be no further chance for improvement. Now compare any of the apparatus on the market with that of the **Swedish-American Telephone Company** and you will see that definite and apparent improvements exist.

For instance take the ringer movement. In others the only difference lies in the size of the screw holes, or perhaps, in the method of adjustment or some other minor detail. The general design is exactly similar in all of them. On the other hand the Swedish-American movement has been changed both mechanically and electrically, and in every way it differs from others.

It will be seen that the permanent magnet is mounted between the coils. The armature is in actual contact with the permanent magnet and is pivoted thereto. In the other forms the permanent magnet does not come closer than a distance of one-fourth of an inch. The permanent magnet greatly helps to increase the sensitiveness of the ringer movement. The closer the permanent magnet approaches the armature, the stronger the magnetic field. The stronger the magnetic field, the more sensitive the ringer movement will be. It is easy to see, therefore, why the **Swedish-American** ringer movement is 25 per cent. more sensitive than any other.

One does not see much change in the construction of transmitters of late. Everybody seems to be striving to get as close as possible to the Bell solid back transmitter and when they reach that goal they are satisfied.

It does not seem to occur to the designers that a transmitter better than the Bell can be made, so they rest on their laurels. It is an actual **fact, however,** that the improvements in the **Swedish-American** transmitter have made it greatly superior to the Bell long distance transmitter. It is just the same with all the parts of the telephone. You can see individuality in the lines of all the apparatus.

Take the generator for example. It has 30 per cent. more winding space than any other, and this means a 30 per cent. increase in the output. The induction coil is so mounted that an inexperienced person can replace it in ten seconds without soldering the wire and without danger of disturbing the circuit.

Their receiver is extremely sensitive and has an indestructible shell. Even the method of wiring is original with the **Swedish-American Telephone Company.** The wiring is arranged in the form of a cable, and each wire is insulated with a different colored material. You can trace any wire in the telephone by the color of its insulation without removing the telephone from the wall.

In these days of close competition, it does not pay to rest on your oars. You must keep a continual lookout for any improvements which will make apparatus more convenient for the customers and at the same time more efficient.

The **Swedish-American Telephone Company** is always looking for means of improving their output, and their customers are not slow to appreciate this fact.

Other points of individuality originated by the Swedish-American Telephone Company and copied by their competitors are:

A protector which covers the bell clapper.
Binding posts for the connections of the batteries.
All exposed metal parts insulated from the circuits.
No hinge contacts.
Ringer and transmitter arm bolted on.
Receiver cord binding post inside the cabinet.
Receiver hook does not depend upon contact springs for tension.
Switch-hook perfectly self-contained.
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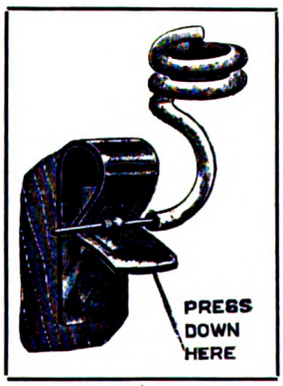

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VOLUME XIII *SATURDAY, MARCH 31, 1906* *NUMBER 13*

Some Telephone High-Tension Crossings*

By John Putnam.

Illustrations from Photographs by the Author.

WE have now seen the importance of protection for telephone lines when crossing lines carrying high voltages, and in the two preceding numbers of this article there have been shown various types of high tension telephone crossings which have been designed and constructed to fulfil various requirements. It is a question whether any of them can be dignified by the name of standard, with the possible exception of the short span type. They probably all tend towards a standard, but only experience can be relied upon to show upon which line future development should be based. It is evident from the varying forms of these crossings that nearly every one presents its own particular difficulties, according to its location.

In the preceding number of this article the inadvertent omission of a sentence destroyed the sense of the description of a three-phase sine curve. It spoke only of drawing two sine curves when, of course, three would be necessary to carry out the illustration. The reader, if interested, undoubtedly discovered it.

What might be called a special design for a telephone high tension crossing is shown in Fig. 9. The problem presented here was particularly difficult, and for a number of years no telephone circuits crossed at this point. Finally, increased growth in this direction made a crossing at this point very necessary from an economical engineering standpoint and to fit in with a cable plan that was being designed. The reader will notice that the highway crosses a broad railroad right of way. On one side of the tracks is the high tension line, on the other a heavily loaded telegraph line. Evidently the short span crossing is out of the question, and there is not room between the telegraph wires and the roadway for open wire telephone lines with a screen. The high tension line is one carrying 11,500 volts, and is used by the N. Y., N. H. & H. R. R. Co., to operate its third rail system between Hartford, New Britain and Bristol, Conn. On the further side of the bridge, the telephone company has an aerial cable, the can terminal in which it ends being plainly seen. This terminal is provided with fuse and carbon protection. Under the high tension line, a grounded messenger wire is strung from the cable terminal pole to the next pole in the line. Locke rings are fastened to the messenger wire and through them are drawn twisted pairs of No. 14 or No. 18 wires, as preferred; No. 18 is of a sufficiently large gauge and is the cheaper. Should the high tension wire fall, it would probably burn in two on the messenger wire and the probability of its damaging the telephone lines on its way down is slight.

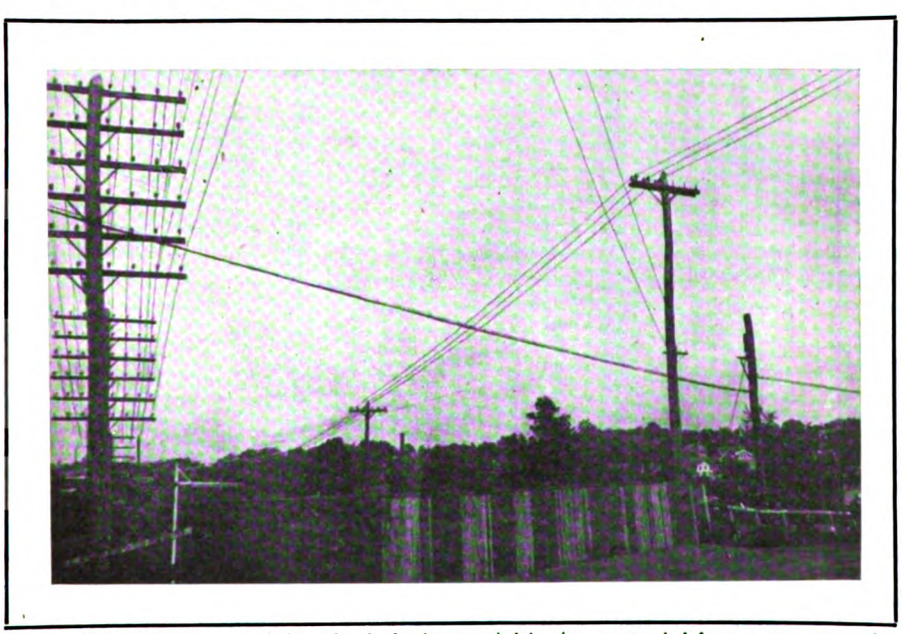

Fig. 9. Telephone lines, consisting of paired wires carried in rings suspended from a messenger wire, crossing beneath 11,500 volt power transmission line.

It will be noticed that on the top of the pole at the right in Fig. 10 there is a guard of wire to catch the high voltage line in case it should become untied. This is an important point and one frequently overlooked. Both telephone and high tension lines should be carefully looked over at all points where they are in close proximity and proper guards placed to catch wires that might become untied and thereby come into contact with neighboring lines. A good design for a guard is one that is frequently seen and used to prevent wires from falling into the highway as the line crosses from one side of the road to the other. It is simply a piece of curved iron in the form of a half circle, drilled and countersunk at one end. It is screwed to the face of the arm near its end and extends outward and up above the end pin, insulator, and outside wire ready to catch it in case it becomes untied. This guard is, of course, intended to be used on the low tension line, or on a line carrying not exceeding 6,600 volts. A 33,000 volt line would easily burn through such a guard or set the wooden arm or pole on fire, consequently such a line would be absolutely dependent upon the security to be obtained by good workmanship in making the tie itself for safety in this particular.

Fig. 11 shows a double crossing and is interesting as involving the idea in Fig. 2, of high poles set close to the line crossed, and a different scheme from any yet shown. It will be noticed that on an arm under the high tension line is a screen made like a net. This net is formed of four longitudinal wires, the two outside ones heavy, uninsulated at the ends, and with a tightening device, while the two inside ones are on insulators and made of a finer gauge wire. The latitudinal wires are given a half connection on the outside heavy wires and are insulated from the inside ones by split porcelains. Fig. 10 shows the netting more plainly. The high tension line, in this in-

*Continued from the issue of March 17.

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stance, carrys 6,600 volts, while the lines crossed are telegraph lines. It is not quite clear to one just what is the purpose of this arrangement, but the intention may be this. Imagine the high tension line to break in the middle of the long span and, like the circus performer, land safely in the net. The current would pass from one broken end through the cross wires onto the outside heavy wire, and, by the same route reversed, to the other broken end of the high tension line, making the high tension circuit good again. This explanation, although theoretically ingenious, may be wrong. Continuing the circus performer analogy, should the outside wire be slightly grounded, as the construction would seem to provide for, the net would be rotten, and the performer, in the guise of the high tension line would go through it and land gracefully on anything underneath, perhaps on a brakeman on a passing train. In all probability this network is made simply to catch the high tension lines should they break at this point, and the fixture seen in Fig. 10, holding the outside wire may be insulated, although it was not possible to determine this by looking at it from the ground.

This high tension line is guyed, as will be seen in Figs. 10 and 11, while the 33,000 volt one is braced, as shown in Fig. 4. Guys don't go well with very high voltage lines, especially when the line is wet, as the following anecdote will show:

It became necessary from a construction standpoint to rock guy a high tension line in the far West. This line was transmitting a current at a voltage of something like 60,000. The guy was attached to the pole below the arm and the other end of it was fastened to a bolt, sunk in a hole drilled in a heavy stone. It is said that the current escaping over this guy melted the solid rock which ran out around the hole in a liquid state. This tale may be put a little broadly, but is not so hard to credit when we recall the experience related in the second number of this article, in which the high voltage wire fell on the ground over a buried conduit made of iron pipe, and fused the earth between the wire and the conduit.

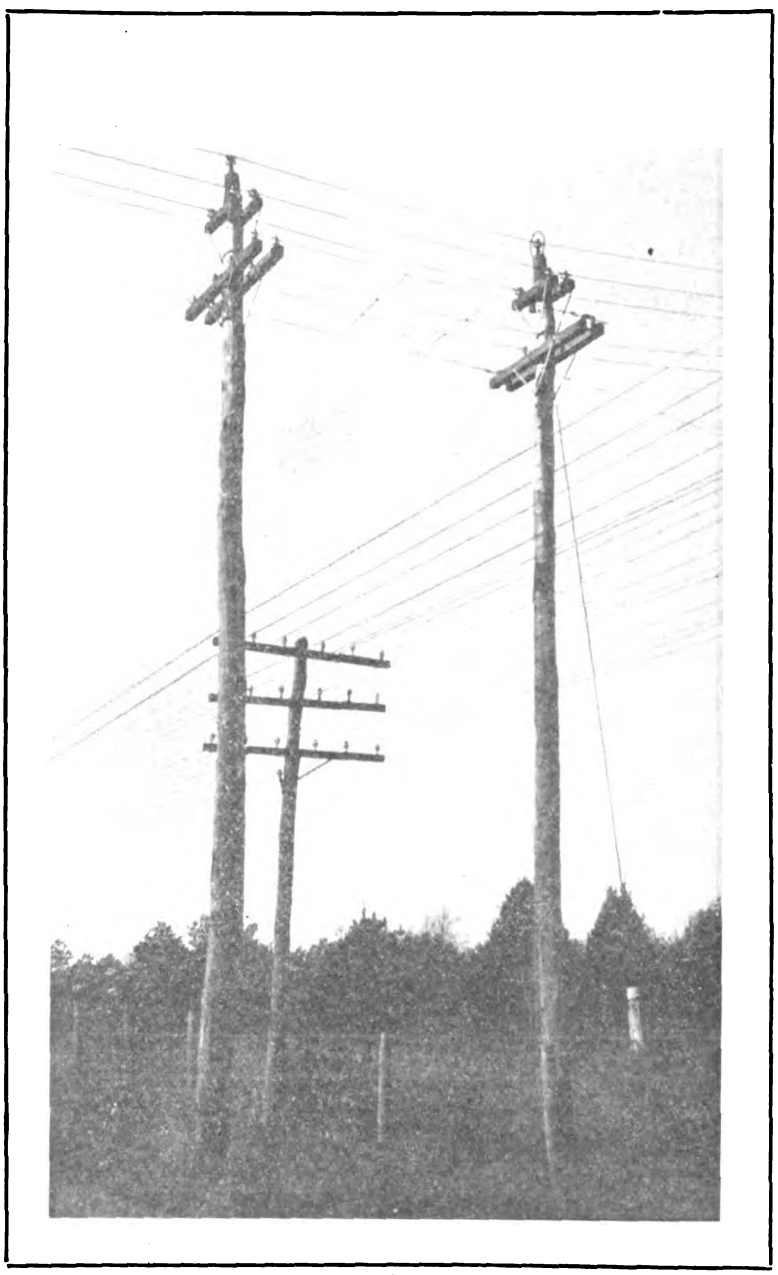

Fig. 10. Typical short span crossing, showing network below high tension wires, mounted well above telephone lines.

All the varied experiences of trouble with telephone circuits caused by high tension line influence brings out one fact like the handwriting on the wall. That is that fuses, as ordinarily designed, are of little use. The voltage of the induced earth seeking currents is so great and the amperage is so exceedingly small that no fuse of the present designs for telephone work will operate. If the trouble is due to inductive disturbance the discharge will have passed so quickly and the current flowing will be so small that the ordinary type of fuse will hardly be disturbed. If, however, the trouble is due to contact with the high tension line, the arc established by the opening of the fuse will be maintained and more damage than good will result. Experiments are being made with specially designed fuses that are very much longer than the ordinary three and one-half inch fuse. The result of these experiments can, of course, only be determined by time and experience. As considerable trouble has been found in keeping the carbon cut-outs clear, there are being used protectors which have a pair of copper blocks, separated from each other by wires. Briefly, we must depend on a grounded lightning arrester for protection from the inductive disturbances, and on these specially designed crossings for mechanical protection from actual contact crosses. In this connection it will immediately occur to the competent installer to look to his grounds at substations and to make them the best he knows how. As for protection for the cables, there should, of course, be lightning arresters at the entering terminals of wires that are liable to be exposed to lightning or high tension discharges.

Attention was called in the first number of this article to the Power Company's telephone line, which is on the north line of the Power Company's double 33,000 volt transmission line. The protection on it was also described, and it was noted that when current was on the high voltage line above it, there was an induced alternating current of 700 volts on this telephone circuit. The writer talked over this wire last summer from New Milford to Waterbury and New Britain, and over the 60 miles of line the conversation could perhaps best be described as "poor commercial." With New Britain cut off and talking over about 35 miles of line to Waterbury telephone transmission was "fair commercial." Translated out of the telephone language one would say that conversation over the 60 miles of the Power Company's telephone line was hardly good enough to sell, but might be sold if the buyers' need was sufficiently great, and that communication over the 35 miles of line was salable, but was not the quality of goods that an up-to-date telephone company would put on the market. It is reported that the protection on this wire has not proved a success and that it has practically been eliminated. It is further stated that the employees at the power station stand on a highly insulated stool when they use their telephone line. In addition to this the Power Company is to lease a good circuit of the telephone company between the above points, all of which seems to go to

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prove that telephone circuits on very high tension line poles are not a success.

A thoughtful review of the conditions which have been set forth brings us to a number of conclusions which are important results of the experience gained with these early installations. For the mechanical protection of the lines the short span crossing should be used in preference to all others, and the screen or underground crossing only as a last resort. Where the lines tend to parallel each other they should be separated by a distance at least slightly greater than the sum of the heights of the two-pole lines. Where this is not possible, efficient lightning arresters should be placed directly on the lines at each end of the exposed portions. In addition to this the cable terminals at which the lines enter and the subscribers' stations that are on these lines should have fuse and lightning arrester protection. While the fuse in the protector is not especially efficient as a protection from the high tension current influence, it should, nevertheless, be a part of the equipment, and on lines exposed to high tension crosses should not be located on the building, but on the pole from which the subscriber's service wire comes or in the service wire itself. Worthy of emphasis also is the importance of frequent and intelligent inspection of these protective devices to make certain that they are in proper working order. As all of the protective devices now on the market are designed for currents under 5,000 volts, any voltage over this should be considered as high tension and treated accordingly. If insulated screens are used, it should be borne in mind that their insulation should be as high as that of the power line, otherwise, their efficiency is destroyed. Also, when grounded guards are used they should be of such size as to burn off the high tension line at the instant contact is established without being severed by fusion themselves. Unless the grounds on these guards are as near perfect as may be obtained, the tendency upon contact with the high tension line is to continue to arc and not burn off. This means that anything short of a ground with practically no resistance is useless.

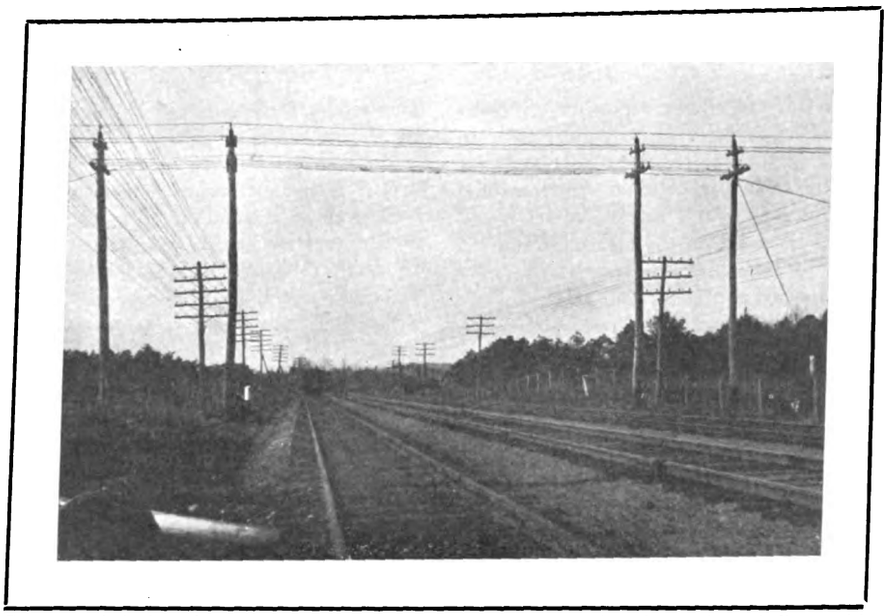

Fig. 11. A double high-tension crossing; 6,600 volt transmission line above telegraph lines, with screen beneath power wires.

The writer had thought to give figures on the cost of these crossings, but such figures would probably be of little value, as the cost of material and labor varies slightly in different parts of the country, and with the distance of the crossing from the base of supplies. Any telephone construction engineer can figure these costs for himself and his territory. The essential feature is to choose the type which shall give the highest economy through the most efficient protection.

Measured Service

By James B. Hoge.

THE method of charging for the telephone in the future will undoubtedly be that of measured service. All of the other public service corporations have been compelled to abandon the flat-rate plan of making charges and adopted a unit of measured basis. Over sixty per cent. of the patrons of the public service corporations think this the only just way of making charge for any commodity furnished, and they object to paying more than their share of the cost of such commodities where less than forty per cent. reap the benefit. In other words, the flat rate induces every one to be more or less extravagant in the use of the commodity. The forty per cent. that are compelled to use abnormal quantities of water, electricity, gas or telephone service would undoubtedly prefer a flat rate as long as possible, but the sixty per cent. that can get along with a reasonable amount of service will demand a fair charge on a measured basis for the commodity furnished them. The most striking illustration of this is the fact that practically all of the municipalities owning their own water works have already gone on a measured basis, or are seriously considering the matter of installing meters, and where they have been installed for a few months, so as to give the citizens an opportunity of trying them out, they have been found to give very general satisfaction.

The installation of proper meters or measuring devices entails a large expense on all of the public serving corporations, and yet it benefits them for the reason that it cuts down waste that cannot help but be costly to these companies. The meter system for telephone companies will be different in some respects from those in use by water, electric light and gas companies. It will be based on a minimum charge which will entitle the subscriber to a limited number of calls; all over that number to be paid for at a fixed rate per call. This will insure a sufficient revenue from each instrument to cover the cost of maintenance and fixed charges on installation expenses. The minimum charge and rate for additional calls will vary in different localities to suit local conditions. The adoption of this system will be an advantage to both the public and the telephone companies. It will correct many of the abuses to which the telephone is now subjected by many of the best meaning subscribers. Where the telephone is paid for according to the number of calls its use will be limited to necessary personal and social calls, and frivolous conversations will be largely eliminated. It will also have a tendency to do away with telephone borrowing, so-called. This is one of the most serious abuses of the telephone to-day. It not only annoys the subscribers to have non-subscribers ask for the use of their telephone, but it also ties up their lines so that important calls for them must be refused on the ground that their lines are busy. At present telephone companies are furnishing this service to non-subscribers gratis, which is not fair to invested capital.

Abstract from paper on "The Future of Independent Telephony," read before the West Virginia Association at the Parkersburg Convention.

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The meter system applied to telephony, by putting the social use of the telephone on a business basis and eliminating other abuses which at present exist, will do much to increase the popularity of the instrument, and will at the same time have a great tendency to increase the number used by making it necessary for every user to have an individual instrument.

The Development of the Telephone Cable*

By Thomas Stanley.

THE requirements of toll line cables are somewhat different from those used for subscriber and local trunk lines. In the one case the length of the cable is small, while in the other it is apt to attain considerable proportions. On the other hand there does not exist in the case of toll line cables the necessity for crowding into a given sized sheath the maximum number of conductors. On account of the increased length care must be taken to reduce the resistance of conductor and static capacity as low as possible. The limit of transmission over a standard underground cable of the dry core type in which No. 19 gauge wire is used, is under the best conditions 60 miles. When, however, an additional length of subscriber cable must be used in making up the line, which is always the case in actual practice, the limit of transmission is reduced to about 35 miles. This latter figure has therefore been taken as the commercial limit of transmission of cable lines of the dry core type.

The first step in the development of a distinctly toll line cable was to increase the size of conductor from number 19 to number 16 B. and S. gauge. The next step was an attempt to reduce the static capacity by entrapping within the cable a greater amount of dry air. With this object in view a cable was constructed in which conductors were separated by small cork wedges placed at intervals equal to the lay. This arrangement is shown in Fig. 9 where the two conductors of a pair are shown at *a* and *b*, and the cork wedges at *c*, *d*, *e*, etc. When the cable was pulled through the duct, the mechanical shocks resulting therefrom dislodged the wedges so that in the end the cable was worse than useless. The cost of construction was found also to be excessive, so that for the present this scheme was abandoned.

A modification of this idea consisted of covering the conductors with a layer of powdered cork. But this plan also proved a

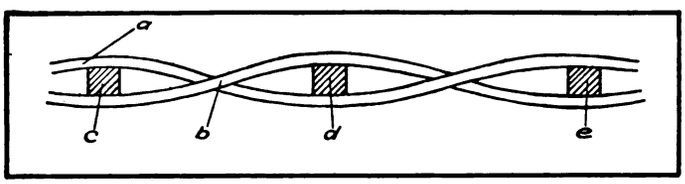

Fig. 9. Arrangement of pair with cork separation blocks, in special type of cable.

failure, and was very soon abandoned. The development of a toll line cable now lies in the direction of increased size of conductors. The advent of the Pupin load coils, by making it possible to counteract the effects of capacity by placing, at stated intervals, points of high impedance, has obviated the necessity of experimenting further along the troublesome line of reducing capacity. So that it does not seem possible that in the near future any radical changes will be made in this direction in the construction of toll line cables.

In constructing cables for submarine, or, more properly, subaqueous work, the same methods as those used in the transatlantic cables were, up to a few years ago, closely adhered to, and it has been within only a few years that any radical change in construction has been adopted. The points aimed at in the construction of the early subaqueous cables were: Flexibility to enable the cable to adjust itself to the uneven bottom; rigidity to render it proof against mechanical shocks; imperviousness to the entrance of moisture. To accomplish these ends, each conductor was made up of stranded wire, and the pairs were bound together with rubber tape, which served the double purpose of maintaining the flexibility, and also, it was supposed, of preventing the entrance of water.

The conductors were made up each of three strands of No. 22 B & S gauge soft drawn copper wire twisted together, and covered with an insulation of rubber compound 3-32 in. in thickness. Over the rubber was wound one layer of light tarred tape. In order to guard against the chemical action that would take place between the rubber and copper, the latter was coated with a layer of tin. The conductors forming a pair were twisted together, the lay not to exceed 4 inches. The pairs were laid up around a central core of jute called *"the filling."* The cable was bound together by two layers of heavily tarred jute serving, and over this was placed two layers of heavy tarred tape. Thus a cable was formed of altogether flexible material, and material of such sort as to resist the action of the water. In order to

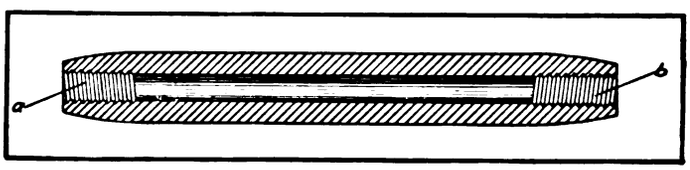

Fig. 10. Steel sleeve used for making a close and firm splice in armor wires in submarine cable.

gain sufficient rigidity, an armor consisting of iron wires, wound helically about the cable, was added, and on top of this were wound two layers of twine. The wire of which the armor was constructed was No. 4 B. W. G. galvanized iron. They were laid on close together in one layer, and the lay was about 24 inches. These armor wires, when necessary, were spliced with a sleeve nut of steel constructed as shown in Fig 10; a right hand thread being tapped at one end, as shown at *a*, and a left hand thread at the other, as at *b*. The two wires to be joined were introduced at opposite ends, and by turning the nut were drawn in so as to "butt." Solder was then run in between the sleeve and wire and a perfectly tight joint thus formed. In Fig. 11 is shown such a cable. One of the conductors is shown at *a* where the three strands can be plainly seen. The rubber insulation is shown at *b*, and the tape with which it was covered can be seen at *c*. At *d* is shown the jute filling, and at *e* and e^1 the two layers of jute serving. The armor wires are plainly seen surrounding the whole, and a joint in one of them, made by the sleeve nut, is denoted by *m*.

This type of cable had the following electrical properties. The static capacity was comparatively high, being as high as .275 M. F. per mile. The resistance of one mile of conductor is 28.372 ohms at 60° F., and the insulation resistance 250 megohms per mile after being immersed in water for 48 hours.

While this type of cable is referred to as old, it is still largely used, and it was only about one year ago that three or four of them were pulled out of the Hudson River at the crossing between Courtlandt street, New York, and Jersey City. The great objection to this class of cable lay in its high capacity, and attempts were made to change the material used for insulation. It was also found that even where the wires of which the conductors were made had a thorough coating of tin, chemical action between the rubber and the copper was sure to take place eventually. This local action resulted not from the fact that the tin was subject to corrosion, but because it could never be so carefully placed but that some slightly bare spot would result. Corrosion started at this point and caused the copper to be eaten away from underneath the tin on both sides of the weak point.

* Continued from the issue of December 30th, 1905.

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Again, it was found the materials with which the cable was made were not impervious to moisture. A new type of cable was therefore made up in the same manner as that described above, with the exception that outside of the jute was placed a lead sheath of the thickness of ⅛ inch. Over this lead sheath was wound two layers of twine. This type of cable, while not so flexible as the one previously described, possessed the advantage of greater stability and tensile strength. It was perfectly impervious to moisture, and when removed, its junk value was considerable. A cable of this type is shown in Fig. 12.

A desire arose to do away with the iron armor for the following reasons: It was found that the greatest liability to mechanical injury came from the anchors of vessels catching underneath the cable, and either tearing it loose from the moorings or badly kinking it at the point of seizure. It was argued that iron armor offered little protection in these cases. Again the iron armor be it never so well galvanized was corroded by the action of the water to such an extent that after the cable had been in use for any considerable length of time the diameter of the wires was reduced and the tensile strength thereby decreased. A new type of cable was then developed in which the armor wires were replaced by a second lead sheath placed over the inner one. It was supposed that this outer sheath, taken in connection with the inner one, would be equally efficient in resisting mechanical shocks, and, being more flexible, would be less liable to cause the cable to be torn loose from the moorings when caught by a ship anchor. It would also be more easy to handle in both shipping and laying.

With the advent of the lead sheath and the consequent protection from moisture, rubber was replaced by paper as a means of insulation. The paper so used was saturated with asphalt and wrapped around the wire in the same manner as in underground cables with the difference that two layers were used laid in reversed directions. The saving of space owing to the difference in thickness between the rubber and paper insulation allowed of a greater number of conductors being placed in a given sized sheath than was heretofore possible. Since economy in diameter is not a feature in subaqueous cable work, the space saved by the change in material of insulation was taken up by a larger sized conductor. The presence of the lead sheath making it no longer necessary to have a flexible conductor, solid wire was substituted for the stranded wire heretofore used. The gauge was increased

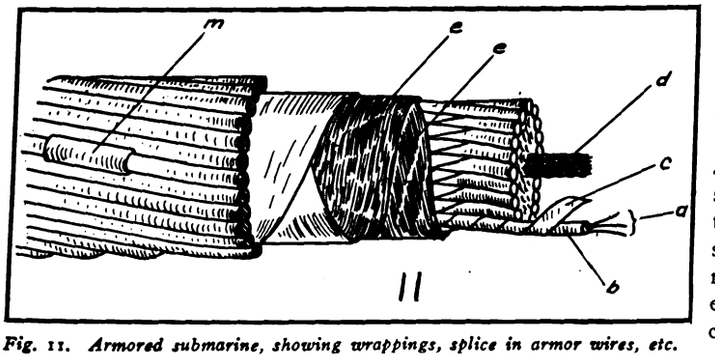

Fig. 11. Armored submarine, showing wrappings, splice in armor wires, etc.

to No. 16 B. & S. A sample specification for this type is as follows:

Conductors.—The conductors shall be of soft drawn copper No. 16 B. and S. gauge having a diameter of .05082 inches. They shall have a conductivity of 98 per cent. that of pure coper.

Insulation.—The insulation shall consist of manila paper saturated in asphalt and wrapped loosely in two reversed layers about each conductor.

Lay.—Each set of conductors forming a pair shall be twisted together, the length of the twist not to exceed 3 inches.

Serving.—The core shall be tightly wrapped with two layers of twine saturated with a bituminous compound.

Sheath.—The core shall be encased in a lead sheath containing 3 per cent. of block tin, perfectly continuous from one end of the cable to the other and being free from flaws or imperfections of any kind. The thickness of this sheath shall be at least ⅛ inch. Over this shall be placed a second or outer sheath of the same composition as the inner, of such a bore as to fit tightly and having a thickness of at least 5-32 inches.

Electrical Tests.—Each conductor shall have a resistance of not more than 24 ohms per mile when layed and ready for service at 60° F. The insulation resistance between each conductor and all others grounded on the sheath shall be not less than 500 megohms per mile at 60° F. after the cable has been layed and ready for service. The capacity between each conductor and all others grounded on the sheath shall not exceed .175 M. F. per mile after the cable has been layed and ready for service.

The double lead sheath cable received a set back shortly after it was introduced. Such a cable laid across the Hudson River from Fishkill to Newburg was injured shortly after being laid by the anchor of a passing vessel. It was found that the sheaths were punctured. A reaction set in against this type for general use, and at present they are only laid across small streams. Another type was developed in which armor wires were placed over

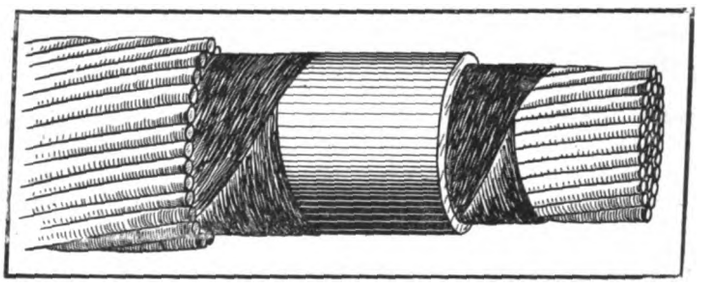

Fig. 12. Type of submarine cable using lead sheath, with jute servings and iron wire armor.

the lead sheath. In this case where only a single lead sheath is used, the following specifications apply:

Conductors.—The conductors shall be of soft copper No. 16 B. and S. gauge, having a diameter of .05082 inch. They shall have a conductivity of 98 per cent. that of pure copper.

Insulation.—The insulation shall consist of soft manila paper saturated in asphalt and wrapped in two reversed layers loosely about each conductor.

Lay.—Each set of conductors forming a pair shall be twisted together, the length of the twist not to exceed 3 inches. The pairs shall be laid up in reversed layers.

Serring.—The core shall be tightly wrapped with one layer of twine saturated with a bituminous compound.

Sheath.—The core shall be encased in a lead sheath containing 3 per cent. tin and having a thickness of 5-32 inch. The sheath shall be covered with three layers of tarred jute.

Armor.—The armor shall consist of galvanized iron wires No. 4 B. W. G., having a diameter of .238 inches. They shall be laid side by side, and wound helically around the core; the lay not to be less than 18 inches nor more than 22 inches. The armor shall be covered with two wraps of hemp laid in reversed directions, each to be saturated with a compound of 65 parts mineral pitch, 30 parts fine sand, and 5 parts water. The completed cable to be whitewashed to prevent its sticking to the reel.

Binding.—At intervals of 100 feet bands of No. 14 B. and S. sheet brass ¾ inches wide shall be wrapped about the armor, the joints being brazed.

Electrical Tests.—The resistance of each conductor shall be not more than 24 ohms per mile at 60° F. The insulation resistance of each conductor and all others grounded on the sheath shall be not less than 500 megohms per mile at 60° F. The capacity between each conductor and all others grounded on the sheath shall be not more than .175 M. F. per mile; all these conditions to hold after the cable has been laid and ready for service.

TEXAS ASSOCIATION TO MEET AT WACO IN APRIL.

MEMBERS of the Texas Independent Telephone Association will hold a convention at Waco from April 25 to 27. As the dates of the convention coincide with the Knights Templars' state meeting the members will be enabled to secure reduced railroad rates and the attendance should be large.

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A Cumberland Confidence Game

A BELL GIFT WHICH COSTS THE SUBSCRIBER MORE THAN THE PATRON OF THE INDEPENDENT SYSTEM IN THE SAME DISTRICT PAYS FOR SERVICE FURNISHED ON A STRAIGHT BUSINESS PROPOSITION.

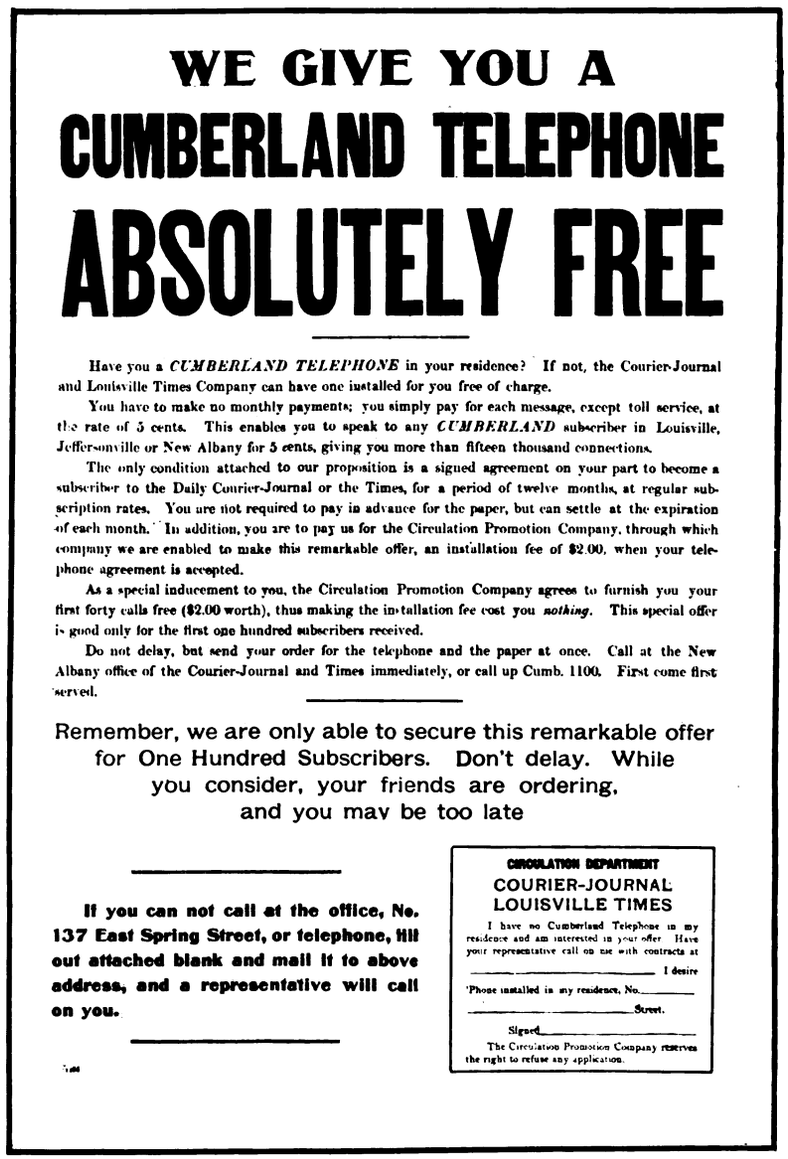
GRATITUDE is due to Bret Harte for the lines of the poem which so ably stamp the ways of the "Heathen Chinee" as peculiar, for they may well be applied to the devices of one of our leading Bell telephone companies.

Some time ago we mentioned a scheme into which the Cumberland Telephone Company had entered with the *Times* and the *Courier-Journal*, two newspapers in Louisville, Ky., for the purpose of increasing its subscription list. The plan upon the face was very alluring. Parties who contracted for a year's subscription to either of the newspapers were intended to understand at the time they made the arrangement that they might get a Cumberland telephone absolutely free.

In order to show exactly how the Cumberland intended to derive an exceptional profit from those unwary enough to seize this attractively prepared bait, further details of the purpose and meaning of this extraordinarily deceptive product of advertising ingenuity are herewith set forth:

Although by the terms of the offer as contained in the advertising columns of the paper a telephone might be expected practically free, an investigation of the actual conditions attached to the contract furnished under this arrangement would compel the signer to pay *for two calls a day, on a two-party line, the sum of* $46 *per year.* According to the terms of this remarkable *gift contract* a subscriber is required to guarantee the company $10 in case the telephones are destroyed by fire, and $15 if the instruments become injured while in his custody. For service, moreover, he is called upon to guarantee a revenue from not less than two calls a day, at five cents each. This amounts to $3 per month and $36 for a year. There must be added to these figures the price of a year's subscription to the paper, $8, which, with an installation charge of $2, brings the total up to $46. This is the minimum charge for two-party line service with slot machines, and *provides for only two calls per day.* Additional calls must be paid for at the rate of 5 cents each.

At new Albany, Ind., there were distributed early in March hand bills which purported to extend to the inhabitants of this place a similar offer. An examination of this poster will show that the possibility that knowledge of the "installation fee" had spread was foreseen, and an attempt made to sugar coat the pill. It is to be noted, however, that this is good for only the first hundred subscribers. The cautious inquirer will not need to look far into this statement to see a loop hole for a second deception in a place where the first is so obvious!



WE GIVE YOU A
CUMBERLAND TELEPHONE
ABSOLUTELY FREE

Have you a *CUMBERLAND TELEPHONE* in your residence? If not, the Courier-Journal and Louisville Times Company can have one installed for you free of charge.

You have to make no monthly payments; you simply pay for each message, except toll service, at the rate of 5 cents. This enables you to speak to any *CUMBERLAND* subscriber in Louisville, Jeffersonville or New Albany for 5 cents, giving you more than fifteen thousand connections.

The only condition attached to our proposition is a signed agreement on your part to become a subscriber to the Daily Courier-Journal or the Times, for a period of twelve months, at regular subscription rates. You are not required to pay in advance for the paper, but can settle at the expiration of each month. In addition, you are to pay us for the Circulation Promotion Company, through which company we are enabled to make this remarkable offer, an installation fee of $2.00, when your telephone agreement is accepted.

As a special inducement to you, the Circulation Promotion Company agrees to furnish you your first forty calls free ($2.00 worth), thus making the installation fee cost you *nothing.* This special offer is good only for the first one hundred subscribers received.

Do not delay, but send your order for the telephone and the paper at once. Call at the New Albany office of the Courier-Journal and Times immediately, or call up Cumb. 1100. First come first served.

Remember, we are only able to secure this remarkable offer for One Hundred Subscribers. Don't delay. While you consider, your friends are ordering, and you may be too late

If you can not call at the office, No. 137 East Spring Street, or telephone, fill out attached blank and mail it to above address, and a representative will call on you.

CIRCULATION DEPARTMENT
COURIER-JOURNAL
LOUISVILLE TIMES

I have no Cumberland Telephone in my residence and am interested in your offer. Have your representative call on me with contracts at _____. I desire 'Phone installed in my residence, No. _____ _____ Street.

Signed _____

The Circulation Promotion Company reserves the right to refuse any application.

Reproduction of Handbill Thrown Out in New Albany, Indiana, During the Early Part of March. The Original is Printed Upon a Sheet 12x18 *Inches in Size and the Words "Absolutely Free" are in Letters* 1 11-16 *Inches Tall. Note the Small Type in which Actual Costs are Set Forth!*

The excuse for the practice of such trickery may be stated in a single sentence: The Louisville Home Telephone Company gives first-class unlimited service on a two-party line for $24 a year. But one must be deeply prejudiced if he can make this justify the obtaining of subscriptions for its rival by such underhand methods as those in use.

That the plan is both weak and wicked may be easily seen. In the first place the proposition is so worded as to give the impression that the people would be actually able to get telephone service at a nominal cost. This is, upon investigation, found to be far from correct, Further, the phraseology of the advertisement is such as to cause a person to act without due consideration, and this, of course, is what is intended. Last, but not least, it appeals to a class of people who, if pressed with fair and legitimate arguments, would be found unwilling, if not unable, to pay the cost of such service.

After a deliberate analysis of this remarkable state of affairs it becomes self-evident that the Bell is forced to the last ditch, and is ready to take desperate measures to prolong its life. This means that the Cumberland is reduced to putting its service on the premium list. It withdraws from the number of those who place the furnishing of telephone connections in the highest rank of public service, along with the other great necessities of transportation, light and water. Forgetting its old cry of "good service at just rates" it puts its plant, erected at enormous cost, at the disposal of an unwilling public on the same terms as those on which gaudily decorated lamps and thinly plated silver are given with a few pounds of tea by the dealer who is allowed to rest but a few months in a town. These low business standards are sure forerunners of its utter destruction.

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QUERIES

USE OF A SLOW ACTING RELAY.—(676.)

Will you please explain how a slow acting relay operates in a trunk circuit to give a disconnect signal? R. N.

We assume that the circuit to which you refer is an incoming trunk from a toll board, something similar to one of the standard circuits shown in the accompanying diagram, Fig. 676. This shows an incoming trunk from a toll board of standard type. Although there are various trunks for this purpose, using a slow acting relay, and with different arrangements of other parts of the circuit, the particular portion to which you refer is wired the same, and operates in the same manner in all of them. Its purpose is to enable the operation of a single relay in the talking strands to perform two separate controlling functions.

The circuit shown at the left is an incoming trunk to be connected directly to the subscriber's line by the insertion of the plug in his multiple pack. At the toll board end the trunk terminates in a jack, by means of which the toll operator may connect her cord with the trunk in the usual manner. The disconnect signal at the toll board, which is represented by the lamp O is controlled by a double wound relay, with windings N and P. The winding N is bridged directly across the strands of the cord circuit. The winding P, which is a secondary winding, is designed to lock the relay, as may be seeen from the circuit, when it has once been energized by the passage of current through the winding N. That is to say, a single impulse of current of sufficient strength passing through winding N will cause the lamp to be lighted, and to remain lighted until the locking circuit through winding P is broken. In practice this locking circuit, it may be stated, is broken by means of a special pair of contacts in the listening key, which open when the operator comes in on the connection to supervise.

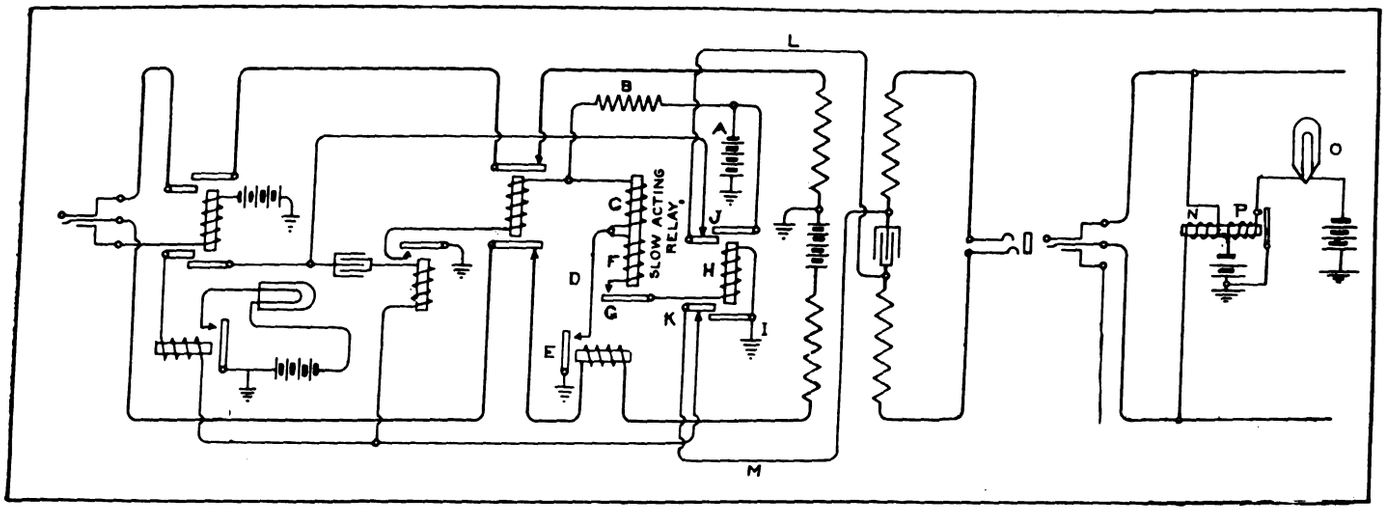

Fig. 676.

The method in which the slow acting relay operates to cause the passage of current from the trunk switchboard to the toll board to operate the disconnect relay is as follows: When the called subscriber is on the line a low wound supervisory relay, which is included in one of the talking strands of the cord circuit, is energized, and the ground connected to its armature E is brought into electrical connection with the central point of the winding of the slow acting relay. Current from the negative pole of battery, A, flows through resistance B and winding C of the slowing acting relay to this ground. This causes the armature of the slow acting relay to be drawn up and held, closing the contacts. It will be seen that when this condition of affairs is obtained there is a circuit from negative battery A through resistance B, windings C and F of slow acting relay, armature G, winding H of the cut off relay, to ground I. It will be noted, however, that a portion of this circuit between the central point of the winding of the slow acting relay and the ground I has considerable resistance, which is effectually short circuited by the path to ground through armature E of the supervisory relay. The winding H, therefore, will receive no current, and the cut off relay will not be energized during the time that the called subscriber has his telephone off the hook.

When he hangs up his telephone the disconnect signal should be given to the toll operator. It should be noted in this connection that the first disconnect signal is properly given to the toll operator, who supervises on the connection; and when she finds that it may be taken down she withdraws her plug, and this gives the disconnect signal to the trunk operator. It is the disconnect signal given to the toll operator, direct from the subscriber, with which we have to deal. When the circuit at the hook contacts of the substation instrument is broken, the supervisory relay allows its armature E to fall back, and removes the ground from the central point between the windings C and F. This permits the current to pass through both windings in series, also through the winding H of the cut off relay. As the windings C and F are so arranged as to neutralize each other, the passage of current through them both will tend to destroy the magnetism in the core of the relay, and cause it to release its armature. It is obvious, also, that the passage of current through winding H will cause this relay to draw up its armature, the effect of which is to throw current from the negative battery A and ground I, through contacts J and K, wires L and M, out over the line to the toll board, and to energize the disconnect relay through its winding N.

In order that this may be the result, it is necessary that the cut off relay shall operate very quickly, as the circuit through its winding is broken as soon as the armature of the slow acting relay falls away from its contact. The slow acting relay is so constructed that this is what actually takes place, an impulse being sent over the line by the operation of the cut off relay, which is almost immediately de-energized by the subsequent falling away of the armature of the slow acting relay, which restores the circuit to a condition which permits the disconnect signal from the toll board to be properly received by the trunk operator.

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THE EDITOR'S PAGE

TELEPHONE NEWS SERVICE.

IOWA Independent telephone men have taken the first step in the establishment of an enterprise which promises to confer most important advantages not only upon their stockholders and subscribers, but upon all the citizens of the entire State. It is planned to systematically and completely gather local news from city and rural districts, and transmit reports each day to the leading daily papers for publication.

The project is a result of the growing demand on the part of the various papers for a system of gathering news which shall be more efficient than the one at present in operation. At the recent convention held at Des Moines a committee was appointed to confer with the press representatives, and an outline of the method in which the two interests should co-operate for the maintenance of this important public service was drafted.

The plan provides for the maintenance at a central point of a force which shall receive the news as it arrives in a continuous series of messages from the numerous outlying sources of information. The systematic use of the existing facilities in furthering this end is to be provided for as follows:

Each telephone station or farmer's line will be utilized for the transmission of reports to its central checking station. A certain number of these central checking stations will be assigned to a definite district, and to the headquarters of each district will be forwarded all reports received by stations located within its boundaries. From the district headquarters the news will be transmitted by telegraph, over simplexed telephone lines, to the general headquarters. At a predetermined hour each member of the press association will be placed in connection with all other members and with the distributing station, and the news for the preceding twenty-four hours, systematically classified, will be given out.

Newspapers will be able to derive most important advantages from this method of receiving reports. News will be gathered from sources in close proximity to the points where important events occur, by authorized persons. This, in itself, will be an almost invaluable aid to the securing of a complete and accurate service. Transmission will be accomplished without the loss of time which is attached to the present method of forwarding reports of matters of secondary importance by mail. The low cost of conducting this service compared to the plan involving the use of the telegraph and the duplication of messages to the various papers will bring about substantial economies.

The telephone companies will likewise be substantial gainers. The headquarters of the service will be established at the Clearing House. In this special service there will be realized, upon what is substantially a by-product of the regular use of the lines, a profit which it is expected will more than pay the entire expenses of the Clearing House Association, and is very likely to leave a sum for distribution amongst the supporting companies as dividends. As this amount will be obtained without the need of extra investment in construction, it may be set down as just so much additional profit on necessary investments. Moreover, its operation will tend to still further unify the great body composed of the interconnecting Iowa systems, and promote the feeling of community of interest which is doing so much to advance the progress of the Independent companies.

The details are being worked out by an organization which already has a firm foundation for the carrying on of the business, and its practical success is assured. When it is in effective operation it will confer upon the Iowa association a prestige which will still further emphasize the prominence of the state in Independent telephone development.

A CONSPICUOUS PRODUCT.

AS an example of apparent simplicity in complex objects the modern telephone switchboard deserves to take equal rank with the most conspicuous products of engineering skill. The highly satisfactory results which are to-day secured by switchboard designers are the result of numerous efforts to not only secure a simple, compact and accessible arrangement of a very great number of similar parts, but to combine in the manner best suited to the practical requirements of operation and maintenance a considerable number of diverse elements.

These elements, moreover, are of such a nature that the electrical and mechanical requirements which control their location must all be fully determined and carefully observed. For instance, in the designing of apparatus, these have an especial effect in relation to its bulk, which therefore is an important factor in the matter of its location. The various apparatus connected in the circuits in use in a modern switchboard call for insulation which shall be appropriate for alternating ringing current at a potential of about 100 volts, as well as for a direct signalling and transmission current of 24, 40 and 48 volts, according to the type of the board in use. This leaves wholly out of consideration the fact that somewhere in the switchboard must be run a circuit for lighting, which ordinarily carries the usual 110 volt lamps. The problem of insulation is one, therefore, which brings into effect important mechanical reactions, but it is not the only one, nor in fact is it the most serious one which has been overcome by the united efforts of switchboard engineers.

Those who have been connected with the work for a considerable time are able to tell of numerous instances of the most annoying and baffling troubles, which have been traced to inductive disturbances rather than to difficulties caused by leakage from one circuit to another. The necessity of avoiding such inductive troubles has made it necessary to consider the circuit of a line and all its various parts, not only those that are permanently connected, but those which enter into the connection from time to time when a cord is connected to the main line circuit, as a metallic pair, which must be free from twisted parallel wires at all times. This, although many of its details have not been of a nature to class them amongst the more important problems to be solved, has brought about a great deal of most careful work, in order that no cross talk might exist in a closely laid up cable, which is likely to have numerous branches giving opportunities for the splitting of pairs. The use of colored wires has permitted the development of a scheme which is of most substantial use in securing the correct arrangement, as laid down by the engineering force, which can be exactly and economically followed by the men who do the actual wiring in the shops. Further refinement in details may be noted by the consideration of the fact that a switchboard comprises movable parts which cover an extremely wide range, considered both in relation to the extent and the force of movement. When the high state of efficiency and economy, and the ease with which the apparatus may be installed and maintained are considered, the telephone switchboard assumes a leading place amongst industrial products.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

REFUSING SERVICE ON PUBLIC LINE.

A recent statute of this state fixes a penalty against telephone companies for refusal to furnish service within the territory in which telephone companies do business. We some time since took absolute control of a party line, running past the residence of a farmer, and refused to allow the farmer to connect or to furnish him a telephone. At the same time we did furnish the service which we refused to him to other farmers on the line; said farmers being located on all sides of the party to whom we refused service.

The question which we wish settled is this, to wit: Can this party so refused recover the statuary penalty when the facts in the case are as stated with the additional fact that the parties whom we took on the line objected to having the party on the line, and said to us that in case we took him on the line, they would withdraw from the company and go elsewhere? C. T. CO.

A TELEPHONE company is a common carrier of intelligence, and is bound by the same rules that apply to other common carriers such as railroads, express companies and steamers. As a common carrier, a telephone company is bound to furnish all who apply with telephone service. There is no exception to the rule even where other patrons of the company object to the applicant. It might be, however, that by ascertaining why the other patrons object to being on the same line with the applicant, you might find that their reason was a sufficient one to justify you in refusing. The justification must not be a frivolous one, or a pretext, but would have to amount to some reason making the use applicant proposes to make of his telephone an illegal one. An example of such an illegal use as would justify a refusal of service is that applicant proposes to use the telephone in a gambling establishment. For the rule that telephone companies are common carriers see Hackett v. State, 105 Ind. 250.

ORDINANCE FOR JOINT USE OF POLES UNFAIR.

AT Utica, N. Y., a referee has rendered a decision in the case of the Utica Home Telephone Company against the city of Utica, which was an action to enjoin the defendant from interfering with plaintiff's poles and wires on Dakin street in that city. The Utica Home Telephone Company, the Utica Gas & Electric Company and the Central New York Telephone Company, prior to 1905, were all lawfully maintaining their separate poles on the same side of Dakin streets. In May, 1905, the common council, being about to pave the street and construct a stone sidewalk which would occupy the place taken by the poles, directed the three companies to move to the north side of the street within five days and use the same poles. The Utica Telephone Company contended that the regulation requiring the joint use of poles was unreasonable and did not move its poles, although the other companies moved theirs. The common council then directed the city engineer to immediately remove the poles and anchors of the company and an injunction was at once obtained by the company. The referee held that if simply a transfer from one side of the street to the other had been ordered, giving the plaintiff the same rights on the north side that it had on the south, the regulation would have been reasonable and enforcible. The terminal pole of the plaintiff received its wires from a lateral subway and thence, from its cable box and numerous arms, the wires are distributed as the exigencies of the business required. The referee found a good deal of force in the idea that a company whose business requires such a pole should have the entire control of it, and should not be compelled to use it jointly with other companies, at least unless the requirement of joint use should be accompanied by regulations that reasonably insure the safety of employees and were binding on all parties. It was therefore held that the direction of the city for joint use was unreasonable, and an injunction was accordingly granted.

TELEPHONE LINES TRANSFERABLE AS REAL ESTATE.

We have a patron who sold his farm here and we want to know if his telephone would have to go with the farm, as nothing was said about it when the farm was sold. We built the main line along the public road. The farmer builds his line from his house out to our line. He also furnishes his own telephone, and pays us fifty cents per month for the use of our main line, and fifty cents per month for switching, making one dollar per month, so let us know if telephones in such cases go with farms when sold, or if it is customary for him to take down telephone and take it with him. G. T. E.

UNLESS the party erecting the telephone line and the party on whose land the line is erected agree otherwise, the telephone line becomes affixed to the real property and is considered as part of it. Therefore, when the real property is sold, and nothing said about the telephone line, the telephone line is naturally included in the sale, and is disposed of as part of the real estate. Upon these principles the editor considers that the telephone line in your case goes with the farm, as nothing was said about it when the farm was sold. The man selling the farm would not have the right to take the system down and take it with him. See the following cases: Amer. Union Tel. Co. v. Middleton, 80 N. Y. 408. Boston Safe Deposit & Trust Co. v. Tel. Co., 36 Fed. 288. N. Y., Ont. & Western Railway Co. v. W. U. T. Co., 36 Hun. 205. Shelbyville Water Co. v. People, 140 Ill. 545. Frechet v. Drake, 12 Pacific 694.

FRAUD CHARGED IN EXTORTIONATE RENTALS.

IN an answer filed in the Circuit Court to the Chicago Telephone Company's bill for an injunction, the Wapaul Electric Company accuses the telephone company of extortion in the rentals charged for special apparatus. The company is charged with fraud in demanding $50 extra for its metallic service telephones, and the answer asserts that the old Bell telephone is almost worthless.

The answer alleges that the Chicago Telephone Company by fraudulent representations extorts $175 a year for a metallic circuit telephone by pretending that the extra charge of $50 is necessary because of changing the circuit. It is charged that the installation of a new telephone often changes an apparent "grounded wire" service into a metallic circuit.

The answer declares that the charge of $30 a year for a desk extension is extortion, for the reason that the investment does not exceed $10 and the maintenance $1 a year. It asserts that the rental amounts to 300 per cent. a year, while 30 per cent. would be a reasonable return on the investment. The answer alleges that the company charges $3 a year for a button and buzzer which does not cost to exceed $1 to install and 20 cents a year to maintain, and that the switchboard, for which a rental of $6 a year is charged, can be installed for 50 cents. It is alleged that each of the company's "special arrangements," for which $6 to $20 a year is charged, are frauds of a like nature, since the apparatus involved need not cost to exceed $1 and nothing for maintenance.

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IN THE OPERATING FIELD

INTERSTATE COMPANY TO APPLY FOR FRANCHISE IN CHICAGO.

BACKED by ample capital, the Interstate Independent Telephone and Telegraph Company is ready to apply for a franchise in Chicago. State Senator Henry H. Evans, of Aurora, president of the company, in a recent interview declared that he would have no trouble in securing the necessary capital for construction purposes, should the City Council decide for competition in the local field. He also stated that the proposed new service would place Chicagoans in communication with 50,000 residents of Illinois who are now using the Independent telephone service.

The company offers a flat rate of $80 for business telephone and $45 for residence service in exchange for a twenty-year franchise. It is willing to pay 5 per cent. of its gross receipts for compensation, and to set aside $10,000 in cash to secure the city from loss or injury during the period of construction. It will give a bond for $100,000 as surety.

The Interstate Company at present is in Whiteside, Kane and Will counties and in Springfield and Peoria.

An ordinance providing for the grant to the Interstate Indepent Telephone and Telegraph Company has been introduced into the City Council by Alderman Burns.

INDEPENDENT FRANCHISE UP FOR CONSIDERATION IN CINCINNATI.

AFTER a delay of over two months the application of the Queen City Home Telephone Company of Cincinnati for an Independent franchise has been taken up for consideration by the Council Committee on Railroads and Telegraphs. A large amount of statistics and general information relative to the value of two telephone systems has been presented to the board.

A great deal of this matter sets forth the advantages of competition and the great improvement in service together with the decreased cost resulting from the competition thus created.

There have been received numerous letters from residents in various cities where there is Independent service in which the writers state that they are decidedly in favor of a competing Independent company.

Philadelphia, Pa., and Cleveland and Hamilton, Ohio, are the principal cities which are used as a basis for argument.

ILLINOIS INDEPENDENTS ORGANIZE FOR MUTUAL ASSISTANCE IN BUSINESS.

SIXTEEN Independent telephone systems in the neighborhood of Galesburg, Ill., recently formed an organization for the purpose of co-operating with other Independent district organizations to fight the Central Union for toll and long distance business. Among the larger cities represented were Galesburg, Burlington, Canton, Kewanee, Monmouth, Macomb and Aledo.

The officers elected were: President, W. J. McQuiston, Monmouth; vice-president, C. M. Erwin, Macomb; secretary-treasurer, R. G. Roadstrum, Galesburg.

Measures were taken to connect with the systems of other districts and to promote a central clearing house.

Illinois is divided into nine districts, and this is the sixth, comprising the counties of Mercer, Knox, Henderson, Warren, Hancock, McDonough, Schuyler, Adams and Brown.

One of those present at the meeting was W. B. Burke, of Burlington, Iowa, representing the Mississippi Valley Telephone Company of eastern Iowa. He reported that within the next thirty days the line will be extended across the Mississippi River at Burlington, Iowa, which will place the Sixth Illinois district in direct communication with eastern Iowa, opening up direct long distance communication with Muscatine, Ft. Madison, Davenport, Ottumwa, Des Moines and other Iowa towns.

DEVELOPMENT ON PRINCE EDWARD ISLAND PROVIDES SATISFACTORY SERVICE.

FROM a report submitted at a meeting of the stockholders of the Prince Edward Island Telephone Company, it was learned there are upwards of six hundred telephones in operation, three hundred and seventy-five being in Charlottetown. During the past year a great deal of new construction has been done both in the town and country. Lines have been rebuilt and new toll offices opened.

During the coming year the service will be greatly extended, it being the object of the company to give the subscribers in rural districts every facility in the way of telephone communication. The officers who were re-elected are: B. Rogers, president; A. E. Ings, treasurer, and H. James Palmer, secretary.

REMEDY OF DEFECTIVE STATUTE URGED BY OHIO INDEPENDENTS.

PRESIDENT FRANK L. BEAM, of the Ohio Independent Telephone Association, has recently mailed letters to Independent telephone men in Ohio urging them to support a bill which has just been introduced in the legislature. This bill, if it becomes a law, will permit an Independent telephone company to enter Cincinnati.

The bill amends the present laws providing that companies beginning operation, as well as those already operating in a city, may be granted the right to construct conduits, lay cables and construct other underground facilities. By a technical defect in the law, as it now stands on the statute books, only companies at present in operation can be granted the right to lay conduits, and this has been taken advantage of to bar Independents.

In his letter President Beam says: "The bill is one to insure to newly organized telephone companies the right to occupy city streets with conduits and underground construction, and without this change in the law no new exchange can ever be constructed in Cincinnati."

NEW PLANT FOR INDEPENDENT COMPANY AT EVERETT, WASH.

PLANS and specifications for a two-story brick building to cost $20,000, prepared by B. F. Turnbull, have been accepted by the directors of the Farmers' Mutual Independent Telephone Company, of Everett, Wash.

The company has actively begun soliciting business among merchants, under the supervision of J. E. Friars, who will probably take the position of manager of the local office.

The plans represent a handsome front elevation in modern classic to be built of pressed brick and galvanized iron construction. The building will contain all the latest improvements known and will occupy a ground space of 50x64 feet. French plate glass windows will be used throughout.

A switchboard having a capacity for 7,000 telephones has been ordered, and the construction of the building will be started at once. Part of the first floor is to be arranged with a kitchen and dining room for operators, and the remaining space will be taken up by offices and public booths, and a resting room for the girls.

The second floor will be given up to the switchboard and the

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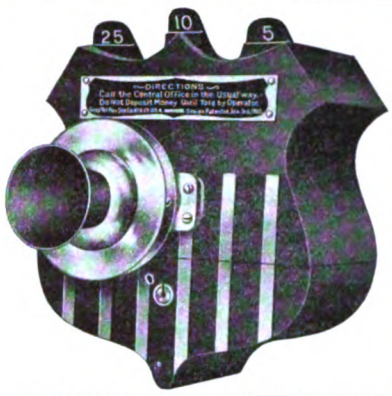
GRAY TEL. PAY STATIONS

FOR — QUICK SERVICE, LOW MAINTENANCE, SATISFACTION



You Simply Drop The Coin In Slot

No Levers or Springs To Break or Stick

GRAY TEL. PAY STA. CO., HARTFORD, CONN. SEND FOR IT

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—6-100 pair and 11-50 pair Sterling Inside Terminal Heads complete with heat coils. Used very little and good as new. Address, Macon County Telephone Co., Decatur, Ill. 580

FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—1,800 line, multiple, lamp signal, Central energy switchboard of latest Stromberg-Carlson make. Just from the factory. Not yet unpacked. Terms to suit. Also modern telephone exchange and electric light plant in progressive South Carolina town of over 2,000 inhabitants, $14,000; $3,000 cash; balance on easy terms. Piedmont Electric Co., Anderson, S. C. 563

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

THE point is just this! Are you dissatisfied with your present position—or have you an employee who is unsatisfactory—in either case, where could you turn better for relief than to a corps of trained employment experts? We have secured better positions for thousands of men, and have supplied thousands of employers with competent men. Why hesitate? Booklets can be secured for the asking. Hapgoods, Suite 511, 309 Broadway, New York City. 464

WANTED—Telephone men experienced in automatic switch work. State experience and salary expected. Address Supt. of Equipment, Home Telephone & Telegraph Co., Los Angeles, Cal. 581

WANTED—Position as manager of common battery exchange. Have 10 years' practical telephone and business experience. Married and of good character. Salary no less than one hundred dollars per month. Address, Box 579, care, THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 579

WANTED—State representative wanted by telephone manufacturer for Pennsylvania and Ohio. One familiar with common and local battery apparatus. Address Box 578, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 578

WANTED—Cable splicer. Young man thoroughly competent to splice lead cables, underground and aerial. Work must be first class. Permanent position to right man. Address York Telephone Company, York, Pa. 576

Insulated Electrical Wires and Cables

ROEBLING

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

Agencies and Branches

NEW YORK CHICAGO CLEVELAND
SAN FRANCISCO PHILADELPHIA ATLANTA

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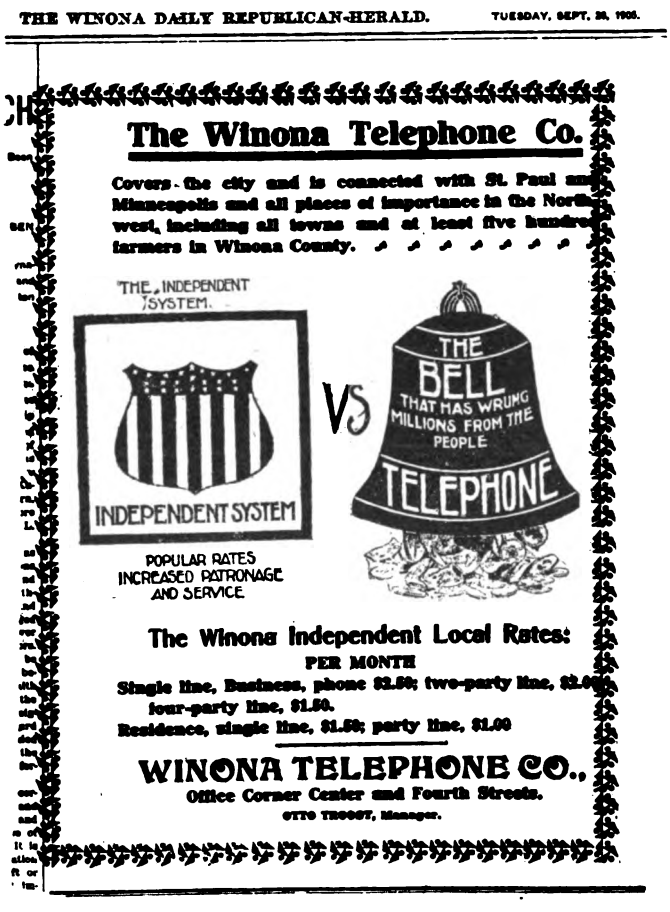
basement will be used for the terminal room and wire chief's department.

J. M. Winslow, general manager of the company, states that the excellence of the Seattle system, which has absorbed the Farmers' Mutual, will be maintained in Everett. In Snohomish the company has 300 telephones, and he claims that the system when installed in Everett will place subscribers in touch with 1,500 farmers in Snohomish county.

It is expected that the plant will be in operation shortly after the first of April.

ANOTHER PIECE OF INTERESTING ADVERTISING COPY FROM WINONA.

LOCAL and rural connections as well as toll service are furnished in a manner extremely satisfactory to its subscribers by the Winona Telephone Company, of Winona, Minnesota. The exact information needed to bring a certain class of non-subscribers into line for telephone service is given in the


THE WINONA DAILY REPUBLICAN-HERALD. TUESDAY, SEPT. 29, 1908.

The Winona Telephone Co.

Covers the city and is connected with St. Paul and Minneapolis and all places of importance in the North west, including all towns and at least five hundred farmers in Winona County.

THE INDEPENDENT SYSTEM.

INDEPENDENT SYSTEM

VS

THE BELL THAT HAS WRUNG MILLIONS FROM THE PEOPLE

TELEPHONE

POPULAR RATES INCREASED PATRONAGE AND SERVICE

The Winona Independent Local Rates:

PER MONTH

Single line, Business, phone $2.50; two-party line, $2.00; four-party line, $1.50.

Residence, single line, $1.50; party line, $1.00

WINONA TELEPHONE CO.,

Office Corner Center and Fourth Streets.

OTTO TROGST, Manager.

well designed advertisement which we reproduce upon this page. Just enough to make him think he can get the service he wants, that it will pay—and then the reason for making it Independent!

INDEPENDENT TELEPHONE MEN IN FIFTH OHIO DISTRICT HOLD MEETING.

INDEPENDENT companies forming the fifth Ohio district held a meeting recently at Lebanon, Ohio. Owing to the absence of Mr. W. Gilbert Thompson, Mr. Frank Binkley was selected chairman. The convention was called to order at 1:30 and proceeded to elect the following officers for the ensuing year. W. Gilbert Thompson was re-elected president, and E. E. Williams secretary.

The convention chose the following delegates to meet at the State Association at Columbus on March 29: Clermont County, W. R. Fee, W. H. Baum, regulars; J. D. Wakefield, G. H. Eveland, alternates. Preble County, A. M. Fudge, S. A. Morton, Elam Fisher, regulars; Lee Lush, S. B. Douglas and J. S. Stewart, alternates. Butler County, W. Gilbert Thompson, J. C. Slayback, F. M. Hughes, regulars; O. M. Bake, Charles Griesmer and F. W. Whitaker, alternates. Oxford Telephone Company, S. H. Allen, regular, and E. E. Williams, alternate. Warren County, J. E. Stoops, Frank Binkley, regulars; M. C. Wykoff and Gibson Lowe, alternates.

W. Gilbert Thompson was chosen to represent the fifth Ohio district at the National Interstate Independent Telephone Association's convention in St. Louis in June.

MERIDIAN HOME TELEPHONE COMPANY FORTUNATELY ESCAPES LOSS FROM TORNADO.

OWING to the major portion of its line plant being underground, the Meridian Home Telephone Company suffered very little damage on account of the recent tornado at Meridian, Miss. When the city was subjected to the greatest damage the circuits were mostly run in underground cable. In the outlying portion of the town a large number of poles were blown down or broken off, but these are now almost all reset and the business is being conducted as usual.

MEETING OF THE IOWA INDEPENDENT TELEPHONE ASSOCIATION HELD AT DES MOINES.

PROJECTS which promise to be of substantial benefit to the Independent telephone men of Iowa were outlined at the recent convention.

The rapid advancement of the Independent movement in Iowa was shown by the fact that there were present about 250 delegates, and these men represented 126,000 Independent telephones.

Papers were read and discussion held on the following subjects: S. S. Lichty, of Waterloo, the president of the association, complimented its members on the progress made. He denied a report which had been published that the purpose of the meeting was to effect a combination. "Our Friend, the Farmer," was the subject of an address to be presented by Dr. Nelson, of Dayton. As he was not present the subject was discussed informally.

On the second day papers were read on "The Best Method of Handling Subscribers' Toll Accounts," H. A. Douglas, Cedar Rapids; "Care and Maintenance of Equipment," R. A. Walker, Iowa Falls; "Better Long Distance Connections," C. H. Smith, Sioux City; "The Clearing House," Geo. T. Hewes, Des Moines; "Our Needs in Iowa," E. E. England, Mount Pleasant.

Thursday was given over to the discussion of "District Organization," Charles C. Deering, Boone; "Tactics of the Opposition," J. H. Shoemaker, Waterloo; "Toll Service," George N. Bandy, Des Moines; "Manager's Experiences," G. T. Everett, Columbus, Neb.

A communication from President James B. Hoge, of the National-Interstate Association, called attention to the damage which has been done Independent companies which have entered into service contracts with the Bell interests.

Committees were appointed as follows: Auditing—F. M. Boardman, Nevada; Levi Baker, Shenandoah; E. E. England, Mount Pleasant. Credentials—D. M. Griswold, Des Moines; E. H. Martin, Webster City; F. Fischer, Shenandoah.

The officers elected are as follows: President, P. C. Holdoegel, Rockwell City; secretary and treasurer, Charles C. Deering, Boone; chairman of executive committee, J. S. Bellamy, Knoxville; chairman of legislative committee, U. S. Alderman; chairman of program committee, C. H. Smith, Sioux City; chairman of entertainment committee, H. S. Baker, Sioux City.

The matter of gathering news for the *Evening Press* association of Iowa during the hours of the day up to 2:30 p. m. was presented by J. H. Smith of Dubuque.

A committee was appointed to confer with the representatives of the *Evening Press* association on this matter. The next convention of the association will take place in Sioux City.

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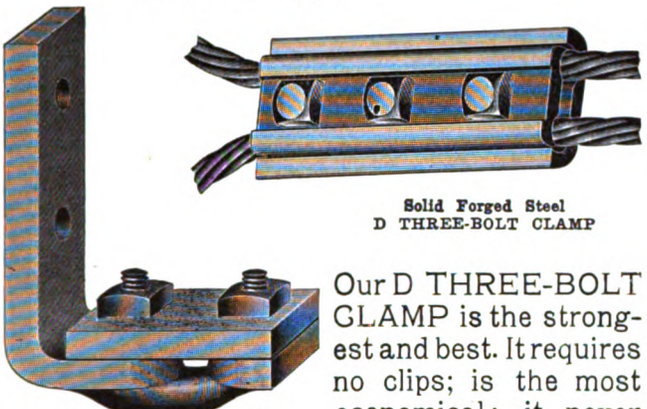
We Make a Few Good Things and We Make Them Right

Look at our DEAD END HANGER. At a glance you can see the simplicity of design, and the great strength.



Solid Forged Steel
D THREE-BOLT CLAMP

Forged Steel Galvanized
DEAD END HANGER
(Patented)

Our D THREE-BOLT CLAMP is the strongest and best. It requires no clips; is the most economical; it never breaks and never slips.

Write for Catalogue of these and other good things

NORTON TOOL CO., West Park, Ohio
ELECTRICAL DEPT.

NEWLY ORGANIZED
Telephone Companies ?
WHAT HAVE YOU DONE

ABOUT YOUR

Incorporation Records By-Laws, &c. Stock Certificates and Bonds?

We have new original Telephonic Designs showing the National Emblem in its beautiful colors.

Spring Construction Work WILL SOON BE UNDER WAY!

Have you the proper records to take care of this important work and safeguard your Material and Pay Rolls?
We furnish New or Old Companies with Complete Office Accounting and Filing Systems.

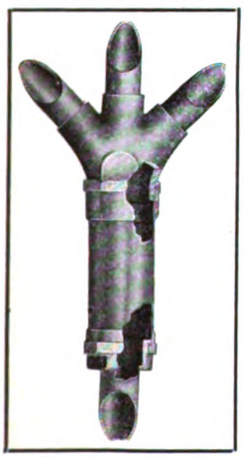
THE Edwards-Hine Co.
TELEPHONE SYSTEMATIZING DEPARTMENT
5 and 7 Pearl Street, Grand Rapids, Mich., U. S. A.

Please mention American Telephone Journal

SECURITY, CONVENIENCE, SAFETY AND ECONOMY

SECURITY POLE SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.
Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton.
You will be pleased on investigation.

Novelty Potheads and Sleeves



Made of selected brass. No expert plumber needed to fit head or sleeve. Always ready for inspection or removal. Waterproof after inspection same as before. Samples sent on trial.
Complete information and blanks for ordering, upon request.

TOLEDO, OHIO
THE F. BISSELL COMPANY
TRADE MARK

THE F. BISSELL COMPANY
TOLEDO, O.

All Copper. Made in 4 Styles

IF YOU ARE SUPPLYING

your operators' transmitters with any type of primary battery, you should have a duplicate set in reserve, both connected to a double throw switch. In case of trouble with one, you can then use the other without delay. The best switch for this purpose is the

Trumbull All Copper Knife Switch

It is made in both single and double contact types. If single contact is used, the positive or negative poles of each set of batteries are connected together and the common wire run direct to the transmitter. The other poles of the batteries are then connected to the knife blade contacts and the pivot point of the blade to the primary of the transmitter induction coil.
If a double contact switch is used, each set of batteries is connected independently to the contact points on one end or the other of the switch, and the pivot points of the blades to the transmitter circuit.
Just let us have your name on a post card and we will tell you why you should use the Trumbull switch and no other.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Ave., PLAINVILLE, CONN.

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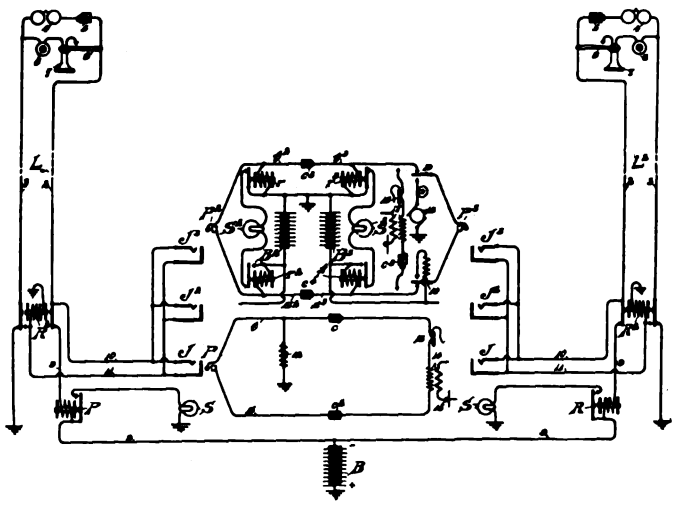
TELEPHONE PATENTS

TELEPHONE SYSTEM.

W. W. Dean, Chicago, Ill., patents (No. 814,118, dated March 6, 1906; filed June 15, 1905; serial No. 161,533) and assigns to the Kellogg Switchboard and Supply Company, Chicago, a telephone system.

This invention refers to a two-wire multiple switchboard and discloses means for testing the line circuits to determine whether they are in proper working condition or not.

Referring to the illustrations, one of the line wires 3 is normally grounded and wire 2 is connected to battery through the line relay



R and wire 9. Line 2 is permanently connected to the tip springs of jacks J, J^2, J^3. The testing cord is terminated in plug P, the tip circuit of which is grounded through retardation coil 12. Condensers c and c^2 provide for connection of an operator's listening set 13, 14, 15, if so desired. The test is carried out in the following manner:

When the plug P is inserted in either the multiple or answering jacks a circuit is completed from battery B, wire 9, line relay R, contact of cut-off relay R^2, wire 10, tips of jack and plug, cord strand t, retardation coil 12 to ground.

If the circuit is in working order the line relay will be energized and the line signal s illuminated. It will be noticed that this test is carried out without operating the cut-off relay or otherwise affecting the normal condition of the circuit. This circuit is intended to be used by an operator for ascertaining the condition of each line at the beginning of the day's business by a "morning test."

The operator's set is to enable a conversation to be carried on without the use of a separate cord. The cord circuit shown above is the regular circuit employed for connecting subscribers' lines and is here shown to indicate the normal operation of the line circuits.

GUY ANCHOR.

Lester D. Pitcher, Daytona, Fla., patents (No. 810,807; dated January 23, 1906; filed September 5, 1905; serial No. 277,044) a guy anchor. This invention relates to a type of anchor which is designed to be screwed into the ground. A shaft is provided with a spiral flange attached thereto by any suitable means, such as riveting. The upper end of the rod is formed into an oblong opening to receive a wedge, and also to serve as a point of attachment for the guy wire. In operation the device is screwed into the ground and when it has been sunk to the required depth the key is inserted transversely through the opening in the shaft and down into the ground to prevent the anchor from twisting out under the strain of the guy wire.

TELEPHONE ATTACHMENT.

Bernhard Ehrlich, Vienna, Austria-Hungary, patents (No. 814,680, dated March 13, 1906; filed May 3, 1905; serial No. 258,609) an hygienic protective attachment for telephones.

The principal feature of this invention lies in the use of sheets of antiseptic material which are fastened to the cap of the receiver in the form of a pad. Through the centre of this pad is an opening which corresponds with the opening of the ear piece. Before the telephone is placed to the ear the top sheet is torn off and thus a new, clean surface is always exposed for contact with the ear. A wire grating is provided to cover the opening in the ear piece for the purpose of excluding all foreign matter.

TELEPHONE SYSTEM.

Ralph Sherer, Eaton, Ohio, patents (No. 813,330; dated February 20, 1906; filed October 17, 1904; serial No. 228,785), a selective telephone system for party lines.

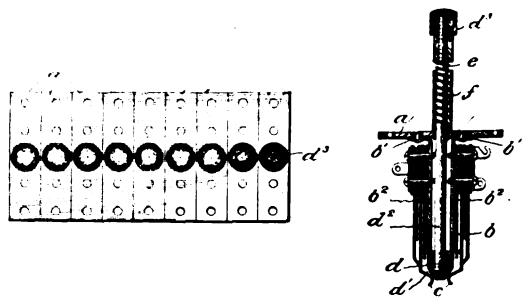
In this invention means are disclosed for preventing any other than the called party listening on a party line. This the inventor accomplishes by means of special mechanism operated by an electromagnet located in the subscriber's instrument, which cuts out all but the desired station. The control of the electromagnet is effected by a step by step mechanism designed to be actuated by a succession of rings from the calling subscriber or operator.

SWITCH KEY.

Edward B. Craft, Chicago, Ill., patents (No. 814,277; dated March 6, 1906; filed December 7, 1904; serial No. 235,851) and assigns to the Western Electric Company, of Chicago, Ill., a switch key.

In this invention a U-shaped supporting plate is employed to hold the contact springs and also serve as a guide for the plunger.

In the illustration this plate is shown at b, which is attached to



a frame plate a by projecting lugs b^1. To each of its sides are attached the necessary switching springs and through the base the plunger d projects. To the upper surface of the frame plate a a tube f is attached, which serves to enclose the spring e employed to retract the plunger after it has been depressed. The object of this invention is to provide a key of the vertical plunger type of such form that a number of keys may be compactly mounted side by side upon the key shelf of a switchboard. With this arrangement each individual key may be conveniently removed from above for purposes of inspection, adjustment, etc.

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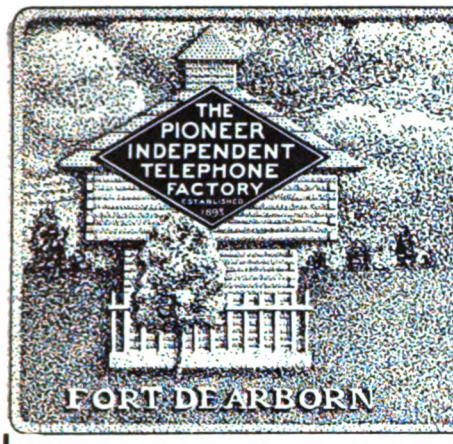


PRODUCERS OF
GUARANTEED
SWITCHBOARDS
AND
TELEPHONES
BOTH MAGNETO AND CENTRAL ENERGY

Type P

IN A LOW BUT POSITIVE TONE
all of our instruments proclaim

Quality, Efficiency, Durability

We guarantee every one of them and every part

Type "P" Ringing and Listening Key is mechanically and electrically as near perfect as it is possible to make it. It has only four (4) wearing parts, and will last for years. When necessary to replace wearing parts, a screw driver and a pair of pliers are all that are needed. No disconnecting necessary.

Frame is a solid piece with nickel-plated top and a lever with black or red rubber handle. Springs are all German silver of the right length and thickness to secure the best effects with pure hard rubber as an insulation. The key has a good action. Contact points are all pure platinum.

A postal will bring illustrations, samples and prices.

Western Telephone Manufacturing Co.
PIONEER INDEPENDENT TELEPHONE FACTORY
Established 1893 No. 58 West Jackson Blvd., Chicago

TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three

Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

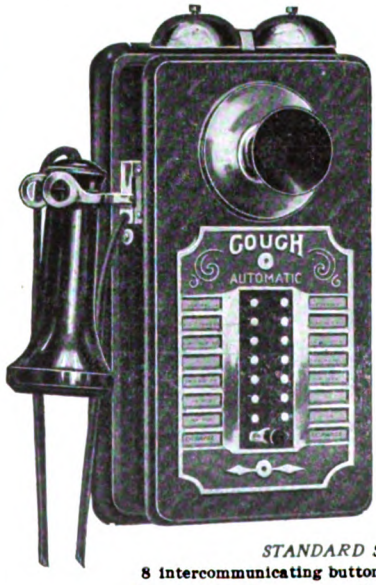
To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company
400 Eddy Street, Sandwich, Ills.

Instantaneous Service



is the kind given by the Couch intercommunicating system. No waiting for the operator to answer the call.

By means of trunk buttons, with which we equip all stations, calls can be made with the exchange from any point. This is the kind of a system a factory, store or office needs and it is the kind that will bring large returns upon the investment.

Trunk Button

Write for particulars

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange	button	
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers
162 PEARL STREET, BOSTON, MASS.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A DEVICE FOR CALLING ON RURAL LINES.

IN the operation of rural lines where a large number of subscribers are connected to the same circuit, it frequently happens that one party wishes to talk to another on the same line. In the act of signaling the exchange is notified, and this places an unnecessary burden upon the operator which should be avoided. To overcome the difficulty Willix & Young, of Mount Vernon, Ia., are placing on the market apparatus which can be attached to any instrument and which enables subscribers to call one another without signaling the exchange, or vice versa. Referring to the illustrations, Fig. *A* shows a generator equipped with the device together with the various parts and Fig. *B* illustrates a home-made relay which is required in connection with grounded lines. The generator attachment consists of a commutator *1* which is attached to the end of the armature shaft and takes the place of the normal vertical contact spring. Associated with it are contact springs *3, 4, 5, 6,* so arranged that when the generator handle is turned to the right the armature circuit is maintained closed continuously and the usual alternating current is delivered for operating the instrument bells on the line. When the generator handle is revolved the other way the armature circuit is closed only during one-half a revolution so that a series of current impulses of either positive or negative sign (depending upon the point of commutation) are being delivered. The line drop at the exchange being grounded and the act of reversing the direction of the armature movement transferring one of the armature coil terminals from one side of the line to ground the drop is actuated through the grounded circuit. If the line is a regular grounded circuit then the relay is necessary. This may be made by anyone according to directions furnished with the generator. This essentially consists of a ringer with a fan substituted for the regular bell tapper. The fan is suspended in oil which dampens its oscillations when actuated by alternating current. When pulsating current is sent over the line the armature is attracted in one direction only. Under this condition the fan receiving several impulses in quick succession, all tending to move it in the same direction, it overcomes the resistance of the oil and moves far enough to close a contact which connects the drop to the lines. A portion of the current will then pass through the drop and it will operate.

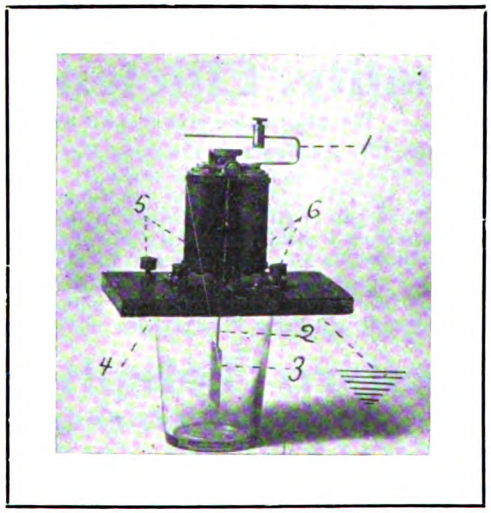

Fig. B. Relay for use on grounded lines.

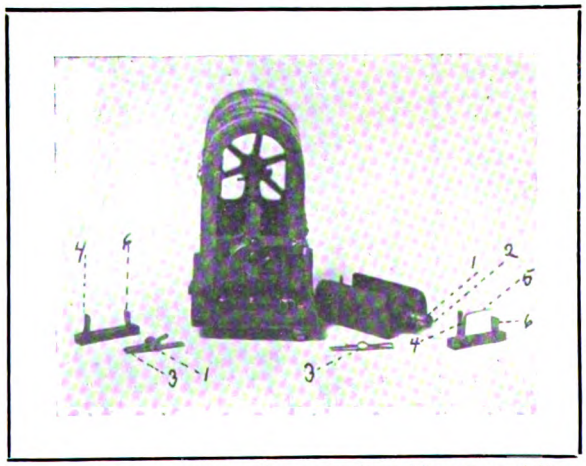

Fig. A. Generator and auxiliary parts for calling on rural lines.

From the foregoing it will be readily understood that turning the crank in the usual way operates the bells and when moved in the opposite direction the drop is actuated without interference. The manufacturers claim that the devices give excellent results and cite a case where 18 telephones on a grounded line using this apparatus have been working for the past fourteen months without any trouble. Further particulars together with a descriptive folder can be secured from the firm.

CUTTING DOWN THE WASTE.

RECORDS showing that 229 "excess minutes" were used for every 100 paid for, when toll messages were timed by a visible clock dial, have recently been made public by the Calculagraph Company, 1437 Jewelers' Building, New York.

In October, 1902, sixteen calculagraphs were purchased by a telephone company and installed, one each, in different exchanges. The records of toll messages made by those sixteen calculagraphs during the month of November were analyzed for comparison with manual records made in the same sixteen exchanges during a previous month.

It was found that while 1,663 fewer toll messages were sent in November, the receipts were larger than during the previous month, and the number of *"excess minutes"* was increased from 6,929 to 22,846, or 15,917 more *"excess minutes"* were shown on the calculagraph records than on those made with a pencil.

The value of those 15,917 toll minutes was $1,126.20, which represents the net earnings of the sixteen calculagraphs for one month, or an average of $70.39 for each instrument.

This result was so satisfactory to the officials of that telephone company that they have since placed an order for one hundred and thirty-eight (138) calculagraphs, Model 6, for use in other exchanges in their territory.

M. C. STONE, 344 PENNA AVE., N. W., WASHINGTON, D. C., is placing on the market a type of paper sleeves for cable conductor splicing that embraces many good features of construction. These sleeves are automatically woven under high tension from a special grade of paper. When completed, they form compact seamless tubes of absolutely uniform dimensions and great strength. They are designed to meet the heat and moisture tests required of sleeves intended for use in cable splicing, and being free from ragged ends and interior obstruction, can be applied with rapidity and satisfaction. They are made with diameters ranging from ⅛ to ¼ inch and can be secured in any lengths desired. Further particulars and prices will be furnished by the company on request.

THE FARR TELEPHONE AND CONSTRUCTION SUPPLY COMPANY, CHICAGO, ILL., has issued a supplementary condensed price list of line construction material. In it quotations are given upon the ordinary lines of construction material such as pins, brackets, crossarms, insulators, lag and bolt screws, guy rods, pole steps, wire cable hangers, rubber cable batteries and protective devices. Copies will be sent to all interested parties without charge.

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Desdemona Sands Lighthouse Station, mouth of Columbia River, Oregon.
All timber, piling, dock, lumber, etc., was treated with Avenarius Carbolineum at the time of construction.
This lighthouse was erected in 1901 and at the present time shows no sign of decay, and no moss, fungus, barnacles or growth of any kind is attached to it.

Above cut is an example showing the high opinion U. S. Engineers have of

AVENARIUS CARBOLINEUM

Government Engineers at Charleston, S C, Savannah, Ga., Chattanooga, Tenn., Rock Island, Ills., Manila, P. I., and dozens of other places, specify its use regularly for

WOOD PRESERVATION

AVENARIUS CARBOLINEUM is a heavy oil for superficial treatment of wood above or below ground to prevent against rot and decay. Applied with a brush, like paint, or by immersion of the timbers —one-third gallon to 100 square feet— it does not greatly increase cost. Always ready for immediate use. Brushes soaked in it will not harden. Has been and is successfully used by the

LARGEST TELEPHONE COMPANIES IN THE FIELD

both Bell and Independent, for

POLES AND CROSS-ARMS

Butt Ends, Gains, and Roofs of Poles can be successfully treated with AVENARIUS CARBOLINEUM at a cost not higher than the cheapest paints.

WE GUARANTEE to double the natural life of POLES and CROSS-ARMS

ON THE MARKET SINCE 1875

Carbolineum Wood Preserving Co.

MILWAUKEE, WIS., AND PORTLAND, ORE.

BRANCHES AND WAREHOUSES: NEW YORK, SEATTLE, SAN FRANCISCO, NEW ORLEANS, ST. LOUIS, CLEVELAND, CINCINNATI

AVENARIUS CARBOLINEUM IS NOT COSTLY AND IT GOES A LONG WAY

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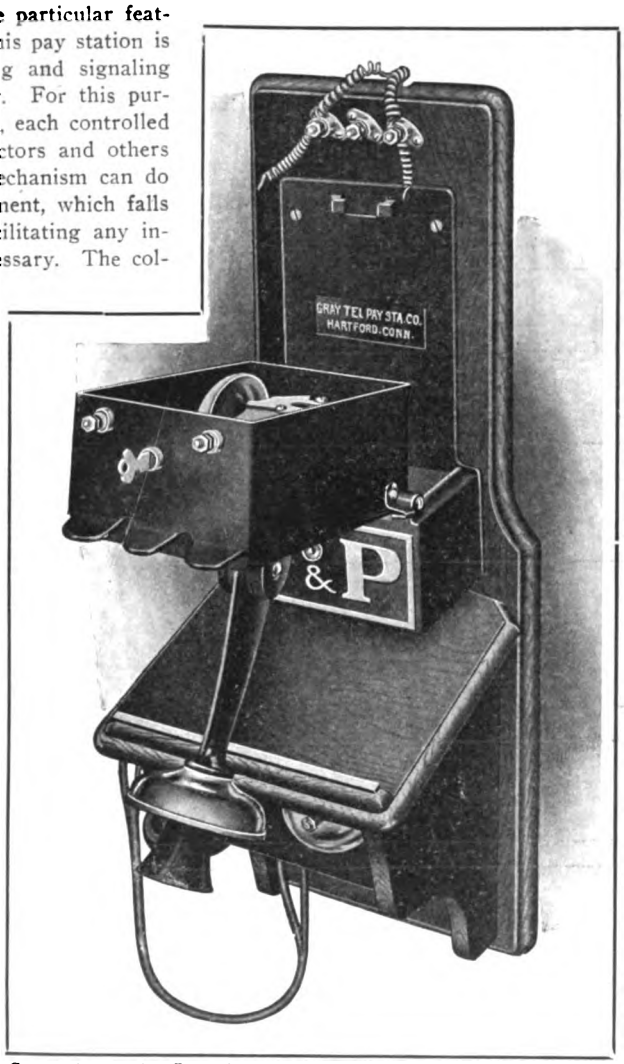
IN THE MANUFACTURING FIELD

AUTOMATIC PAY STATIONS.

PAY station business is generally conceded to be an important source of revenue for a telephone company. By the use of automatic coin collecting mechanism, all responsibility is taken away from the storekeeper in whose place of business it may be, and telephones can be installed in localities where without this apparatus it would be impossible.

To meet the demands of different classes of service the Gray Telephone Pay Station Company, of Hartford, Conn., has placed on the market several types of apparatus, one of which, model No. 23, is illustrated herewith. The particular feature of interest in connection with this pay station is the separation of the coin receiving and signaling mechanism from the money drawer. For this purpose the box is divided in two parts, each controlled by a separate lock and key. Inspectors and others who have occasion to get at the mechanism can do so, by unlocking the upper compartment, which falls forward on hinges, thus greatly facilitating any inspection or repairs that may be necessary. The collector alone, on the other hand, has access to the money drawer, which is independent of the mechanism chamber. This type is designed for nickels, dimes and quarters, and thus can be advantageously used for toll or long distance service as well as local business.



Gray Automatic Pay Station, with money drawer locked while mechanism is exposed.

When ordered in large lots any suitable lettering or design can be placed on the front of the money drawer. The operation of the device relies upon the gravity principle, the simple act of inserting the coins in the slots operating the signals. Further information respecting this and other types of automatic pay stations manufactured by the company will be furnished upon request.

THE WESCO ELECTRIC SUPPLY COMPANY, ST. LOUIS, Mo., has issued the March number of its advertising magazine, "The Live Wire." In it there are numerous interesting stories and short articles relating to electrical apparatus manufactured or for sale by this firm. Accompanying the magazine is a letter from the sales department which draws attention to the present facilities for filling orders promptly. Amongst other items the firm is prepared to ship immediately are paper insulated cables of 25, 50 and 100 pair capacity, telephone wire, brackets, pins and crossarms, besides telephones. Extra supplies have been secured to prevent delays and the firm is very desirous of receiving inquiries relative to electrical apparatus of any description.

GERMANY LEARNING AMERICAN MANUFACTURING METHODS.

WITH a view toward becoming better acquainted with American principles of operation and design of telephone apparatus, George Wolf, a representative of the C. Lorenz Company, of Berlin, Germany, has been visiting the factory of the Dean Electric Company at Elyria, Ohio. He has been making a careful study of the methods involved in the construction of Dean apparatus, as well as familiarizing himself with the factory organization. As a result of Mr. Wolf's investigations, the German firm has entered into an agreement with the Dean Company to use its designs for apparatus upon a royalty basis. This is another gratifying proof of the supremacy of American manufacturers of telephone apparatus.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., reports having closed contracts for switchboards in the following places: Holton, Kan.; Tonopah, Nev.; Nashville, Tenn.; Elkhart, Ill.; Grand Ridge, Ill.; Bryson City, N. C.; Brantford, Ont., Can.; New York City, N. Y.; Sunset, La.; Mt. Upton, N. Y.; Carthage, Ill.; Central Square, N. Y.; Marcus, Ia.; Franklin, N. C.; Auburn, N. Y.; Ladd, Ill.; Diagonal, Ia.; Lytton, Ia.; Woodstock, Ill.; Rochester, N. Y.; Seattle, Wash.; Fontana, Kan.; Clarkesville, Tenn.; New Cambria, Mo.; Cambria, Mo.; Rupert, Ida.; Elkville, Ill.; Ohio, Ill.

FRANK B. COOK, 240 West Lake street, Chicago, Ill., has received from the Dean Electric Company the order for the complete switchboard protection for the new exchange at Quincy, Ill. Specifications call for Cook's No. 8 self-soldering protector. The distributing frame has a capacity of 4,160 pairs, and is to be equipped with 3,200 pairs of the No. 8 protectors.

McMeen & Miller are the engineers who are in charge of the construction.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., has recently issued a clever four-page folder which sets forth in a unique and attractive manner the original features which the products of this company possess. The subject matter is of a useful nature, and it is so arranged as to be interesting. A copy will be forwarded to any office of a telephone company who sends a request.

THE NATIONAL CONDUIT AND CABLE COMPANY, 41 Park Row, New York, has issued a pamphlet entitled "Copper Gossip." The general business outlook and copper market situations are considered at length. Quotations upon copper in both the New York and London markets are given for the five weeks, January 18 to February 15, 1906, and compared with those of the same period a year ago. Statistics relative to the American exports, imports for the months of January and February are also included, together with figures covering the condition of the stock markets in Europe. This folder will be mailed to all interested persons who send their names to the company.

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The largest stock in the country ready for immediate shipment. Our monogram is on each —denoting the highest grade procurable.
Bulletin 200 shows the assortment.

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FACTORY: BROOKLINE, MASS.

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MEASURES TOLL TALK

Operate one handle when conversation begins and the other handle when it ends, and the Calculagraph automatically subtracts the time of commencing from the time of stopping and prints the number of minutes and quarter minutes the toll line is in use.
The Calculagraph insures payment for all "excess minutes."
It makes no clerical errors.
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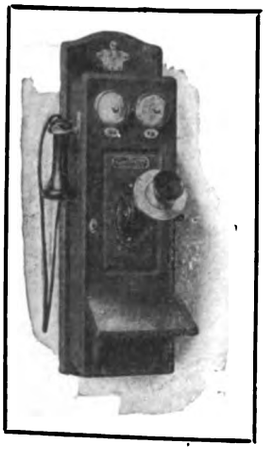
PEOPLE who know tell us we do not overestimate the qualities of our New Beauty Telephone when we say it is the finest instrument ever placed on the market. At first we were inclined to be conservative in our remarks about it because we wanted to secure the opinions of people who knew from experience. Those opinions, couched in terms which leave no loophole for an argument against this telephone, are being secured constantly, and confirm our prophecy that it would become the greatest seller we ever handled.



The U. S. Government specifies them—that is a pretty good recommendation, isn't it? There must be a reason for this.

If you have any questions to ask about quality, price and guarantee, we can answer them to your satisfaction better than anyone else. Write to-day. We can show you.

The Ewing-Merkle Electric Co., St. Louis, Mo.

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THE WEEK'S MESSAGES

FINANCIAL.

HUDSON, N. Y.—The Columbia Telephone Company has declared its sixth quarterly dividend of 1¼ per cent., payable April 2.

MINOT, N. D.—The Minot Light & Telephone Company, Minot, N. D., has increased its capital stock from $50,000 to $100,000.

MARIETTA, O.—The Marietta Telephone Company has increased its capital stock from $100,000 to $150,000.

YORKSHIRE, O.—The Yorkshire Telephone Company has increased its capital stock from $10,000 to $20,000.

FRANCHISES.

COLUSA, CAL.—W. T. Rathbun has applied to the Board of Supervisors of Colusa county for a franchise to construct and operate a telephone system at Colusa.

MAJENICA, IND.—The Majenica Telephone Company is seeking to obtain a franchise at Andrews.

NAMPA, IA.—A. K. Stoddard has been granted a franchise for a home telephone company at Nampa, and construction of the line will commence in about sixty days.

SHEFFIELD, IA.—The People's Mutual Telephone Company of Sheffield is seeking a franchise at Dougherty.

WEATHERSBY, MISS.—Ware & McInnis, who operate a telephone system at Mendenhall, have applied for a franchise at Weathersby.

TRUMANSBURG, N. Y.—The Trumansburg Home Telephone Company has secured the right of way from Trumansburg through Covert to Interlaken for an extension of its system.

WESTERLY, R. I.—The New England Shaver Telephone Company, of Providence, has applied for a franchise at Westerly.

COMBINATIONS.

CORINNA, ME.—The West Penobscot Telephone Company has purchased the interest and franchise of the Corinna Telephone Company. It proposes to commence the construction of new lines.

KENSAL, N. D.—The Kensal Telephone System has been sold to L. C. Lane of Courtenay, who will greatly improve it.

ELECTIONS.

BONDVILLE, ILL.—The Bondville Telephone Company has elected the following officers: President, W. H. Scott; vice-president, Peter Keller; secretary, Otis Norton; treasurer, C. A. Crawford; manager, G. L. Seifkin.

HILLSDALE, KAS.—The Star Center Hillsdale Telephone Company has elected the following officers: President, C. W. Litsey; vice-president, E. P. Roy; treasurer, C. Burdg; secretary, C. E. Wisler.

QUINCY, MICH.—The Southwest Quincy Telephone Company has elected the following officers; President, Wm. Phelps; vice-president, Hiram Corless; secretary, Arthur Luse.

MANKATO, MINN.—The Mankato Citizens' Telephone Company has elected the following directors: W. D. Willard, J. H. James, H. A. Patterson, J. R. Thomas.

ALMOND, N. Y.—The Almond Mutual Telephone Company has elected the following officers: President, W. L. Fenner; vice-president, H. G. Stillman; secretary, D. A. Stebbins; treasurer, Alvin Berry.

WATERVILLE, N. Y.—The Waterville Telephone Company has elected the following officers: President, I. D. Brainard; vice-president, S. S. Bissell; treasurer, P. A. Terry; assistant treasurer, W. J. Butler; secretary, H. M. King.

CARPENTER, S. D.—The Carpenter Telephone Company has elected the following officers: President, T. L. Wood; secretary, E. H. Baker; treasurer, A. P. Janer, Carpenter, S. D.; directors, T. L. Wood, David Cox, Samuel Birks, W. M. Mason, and I. L. Gunmson.

NEW COMPANIES.

HINDSVILLE, ARK.—The Hindsville Telephone Company has been organized and will operate a telephone system in Hindsville.

ENDERBY, BRITISH COLUMBIA.—Agitation is being started at Enderby for a local telephone system. Address W. & H. Harris.

GRAND TOWER, ILL.—The Big Muddy & Grand Tower Telephone Company, Grand Tower, Ill., has been incorporated with a capital stock of $600. Incorporators are M. W. Baysinger, C. D. Gardiner and James Hudson.

OAKLAND, ILL.—The Oakland-Isabel Telephone Company is to be incorporated with a capital stock of $24,000. Incorporators, Elza Blair, of Borton, and others.

ROCK GROVE, ILL.—The Rock Grove Farmers' Mutual Telephone Company has been formed with a capital of $6,000. The incorporators are Lewis E. Rote, William Fisher and Martin Brobst. The company will construct a line between Rock Grove and Monroe.

LOCKMAN, IND.—The South Side Telephone Company, of Lockman, has been incorporated with a capital stock of $2,000. Incorporators are J. C. McKinney, C. W. Spurgeon, C. Carmichael, D. E. Eddy, and Geo. W. Treux.

MANSON, IND.—The People's Co-Operative Telephone Company has been incorporated.

ADAIRVILLE, KY.—The Red River Telephone Company has been organized with the following organizers: T. H. Baird, J. D. Ryan, and W. R. Smith.

HARRIS GROVE, KY.—The Obion Telephone Company has been formed with A. V. McRee as president.

LOUISVILLE, KY.—The Central Home Telephone Company has been organized with a capital stock of $5,000,000. The object of this company is to purchase a number of Independent systems in Kentucky and Indiana.

ATLANTA, MICH.—The Montmorency County Farmers' Telephone Company has been organized with a capital stock of $2,000. President, H. Lundeen; vice-president, Wm. Briley; secretary, T. Mathews.

GLENDORADO, MINN.—The Glendorado Rural Telephone Company has been organized with the following officers: President, O. H. Stay; vice-president, E. Indrehus; secretary, W. F. Penrod; treasurer, S. Kittleson. The company is to build a line from Glendorado to Foley.

REDWOOD FALLS, MINN.—The Redwood County Telephone Company has been organized with the following officers: W. H. Gold, president; F. E. Davidson, vice-president; Geo. L. Evans, treasurer; A. C. Miller, secretary and general manager.

SANBORN, MINN.—An Independent Telephone Company has been formed at Sanborn with a capital stock of $15,000. H. J. Frink, who recently owned the Sanborn Telephone Exchange, will co-operate with the new company, and many new rural lines will be built.

MIDWAY, MO.—The Midway Telephone Company has been organized with the following officers: J. E. Bradley, president; L. B. Burnett, vice-president; Jos. Hood, secretary, and John Batten, treasurer. The company will secure trunk-line connection with the Home Telephone Company at Carthage.

ROGERS, MONT.—The East Fork Telephone Company, with its principal place of business at Rogers, has been incorporated with a capital stock of $6,000. Lines will be built from Rogers to Lewiston. The incorporators are A. V. Rogers, J. D. Clark, S. F. Bowman, of Rogers; J. W. Miller and Walter C. Downing, of Lewiston.

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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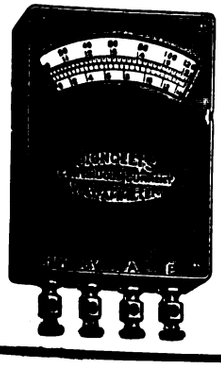
TO BE FOREWARNED IS TO BE FOREARMED



If you are not using a measuring instrument to test your lines, get one at once, as you will need it many times before the summer comes. It would be just as sensible for a grocer to try and sell sugar by guessing at its weight as it is for you to try to locate a fault in a line by the same method. PIGNOLET VOLT-AMMETERS are designed to give the best results required for testing purposes. They are not complicated nor do they require experts to operate them. Another point in their favor is their low cost. There is no instrument on the market which will give you as accurate results at anything near the price. Hadn't you better write for prices and further particulars? By buying one now you will save its cost many times over before you have had it a year.

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78 CORTLANDT ST., N. Y.

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THE WEEK'S MESSAGES

UNADILLA, NEB.—The Unadilla Telephone Company has been organized at Unadilla with a capital stock of $30,000.

STERLING, N. Y.—The Fair Haven & Red Creek Telephone Company has been incorporated with a capital stock of $930. The incorporators are William Bailey, Nelson Cuyler, Veeder Hersey, Milford H. Frost, Herbert Howland, of Sterling; Truman Warner, of Wolcott, and George Robertson, of Red Creek.

VESTAL, N. Y.—The Willow Point Telephone Company has been incorporated with a capital stock of $500,000. The directors are: F. A. Pierce, Chas. Golden, Stephen Noosbickle, E. W. Willis and Orrin J. White, of Willow Point, and L. M. Winans and I. S. Mosher, of Vestal.

SHELBY, N. C.—The Shelby Mutual Telephone Company, of Shelby, N. C., has been organized with a capital stock of $10,000. Charles L. Eskridge is manager.

WASHBURN, N. D.—The Washburn Telephone Company, Washburn, N. D., has been incorporated with a capital stock of $25,000. The incorporators are A. E. Johnson, Washburn; C. N. Hendrise, Thomas W. Allshouse, Steele.

ARLINGTON, O.—The Mutual Telephone Company has been formed at Arlington. P. J. Baker, Chas. Hauman and H. J. Pugh are among the incorporators.

NORTH JACKSON, O.—The North Jackson Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are F. A. Eckis, N. W. Hole, S. H. Goldner, S. J. Clemens and Frank Buchwalter.

PERSONAL.

FRANK B. BURWELL has been appointed district manager for the Bell Company at Charleroi, Pa.

J. E. HANNON has been appointed local manager for the Northwestern Telephone Company at Faribault, Minn.

WILLIAM LEDINGTON has been appointed general manager of the local telephone company at Bellevue, Ohio.

B. C. McCUNE has been appointed manager of the Bell Company at Johnstown, Pa.

MISCELLANEOUS.

EL RENO, OKLA.—The Farmers' Telephone Company and the Topeka and El Reno Telephone Company are to make a connection for the betterment of the service at El Reno.

AURORA, OREGON.—G. W. Scramlin has acquired the property of the Obed Miller Telephone Line, and will connect its lines to his own system, giving him a line of about 250 telephones.

New Construction in the Field

HOLBROOK, ARIZ.—F. W. Nelson, of Holbrook, is interested in the line which is to be built to Springerville. The system will eventually be extended to Fort Apache.

ALHAMBRA, CAL.—The Alhambra Home Telephone Company is to build a line direct to Los Angeles.

KELSEYVILLE, CAL.—The Big Valley Farmers' Telephone Association is to establish an exchange at Finley.

LANCASTER, CAL.—The Antelope Valley Telephone Exchange, owned and controlled by O. F. Goodrich, will build 65 miles of new line to the Gold and Borax Mines via many inland towns.

ARMSTRONG, BRITISH COLUMBIA, CANADA.—The Armstrong Light & Power Company is to build a telephone system throughout the municipality.

BELLECHASSE, QUEBEC, CAN.—The Bellechasse Telephone Company is to extend its lines, connecting with many of the parishes in the counties of Lotbiniere, Dorchester, Levis, Bellechasse, Montmagny and other places.

DANIA, FLA.—M. A. Marshall, of Dania, is interested in a new telephone line which is to be built from Dania to Fort Lauderdale.

HARRISONVILLE, ILL.—The Harrisonville Telephone Company will connect with the rural lines at Waterloo.

HAGERSTOWN, IND.—The Hagerstown Independent Telephone Company contemplates extensive improvements in its system.

SIOUX CITY, IA.—The New State Telephone Company is to build a line to Sloan.

ASSARIA, KAS.—The Assaria Mutual Telephone Company is to build a telephone system for Assaria.

BURLINGTON, KAN.—The Burlington Telephone Company is to rebuild its system at Burlington, and will also construct a line to Westphalia.

EDNA, KAS.—The Edna Mutual Telephone Company is to build lines to Bartlett and Altamont.

SALINA, KAN.—The Salina Telephone Company is to spend about $50,000 in rebuilding its telephone system.

AUBURN, KY.—The Home Telephone Company, which has just established an exchange at Auburn, is to install an exchange at Rockfield.

BILLINGS, MICH.—The Billings Telephone Company is to build lines to Estey and to Hope.

LEWISTON, MINN.—The Lewiston Telephone Exchange contemplates increasing its capital stock from $10,000 to $25,000 for the purpose of making extensions to its system.

MINNEAPOLIS, MINN.—The Tri-State Telephone Company, of Minneapolis, is to build a long distance line to Thief River Falls.

ST. PETER, MINN.—The Nicollet County Telephone Company is to build a number of county lines.

BOONVILLE, MO.—The Boonville Telephone Company is to spend $12,000 in the extension of its system.

NAPOLEON, MO.—The Napoleon Telephone Company is soon to commence the extension of its system over a large territory east and south of Napoleon.

MILLIGAN, NEB.—A telephone exchange is to be installed at Milligan. The City Clerk can give information.

STAPLEHURST, NEB.—The Staplehurst Telephone Company will construct a line between Staplehurst and Seward.

FIERRO, N. M.—The Grant County Telephone Company is to build a line from Fierro to Mimbres Springs.

NANTICOKE, N. Y.—The Nanticoke & Northern Telephone Company is building a line from Nanticoke to Caldwell.

COLUMBIANA, O.—The Columbiana County Telephone Company is to build a line to Salineville.

SHARON, O.—The Farmers' Rural Telephone Company expects to extend its lines through Granger township to Remson Corners.

DRIFTWOOD, OKLA.—The Driftwood Telephone Company is extending its lines to Mirabile.

EL RENO, OKLA.—The Topeka & El Reno Telephone Company is to build a line to Union City, and to make connections with a number of rural lines.

ALTOONA, PA.—The United Telephone Company is to build a line from Altoona to Bedford.

FORT PIERRE, S. D.—The Great Western Telephone Company is to build a line from Fort Pierre to Rapid City, also a line from Presho to Fort Pierre.

MADISONVILLE, TEXAS.—The Madisonville Telephone Company is making extensive improvements in its system.

SHERMAN, TEXAS.—The North Texas Telephone Company, which recently increased its capital stock from $10,000 to $20,000, is building lines all over Grayson and Cooke counties. The company has also purchased the exchange at Whitesboro.

WENATCHEE, WASH.—The Farmers' Telephone Company is to install a new switchboard and other apparatus.

AVOCA, WIS.—The Avoca & Pride Hollow Telephone Company is soon to commence the construction of its system.

NEW LONDON, WIS.—The Interurban Telephone Company is to build a line to Sugar Bush. The old line between New London and Tustin is to be replaced by a metallic circuit.

RUSSELL, WIS.—The Borst Valley Telephone Company is to build additional lines from Russell to Independence.

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WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

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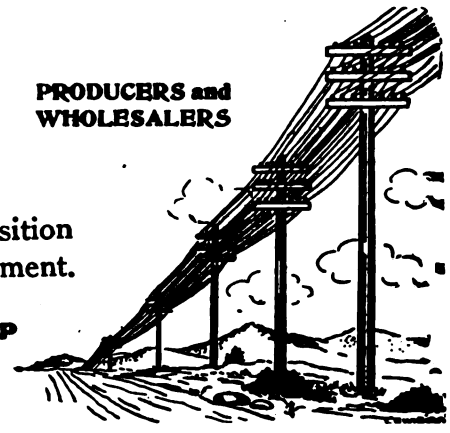

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25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US
Yards { Omer, Bay City and Boyne Falls
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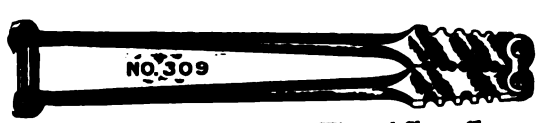

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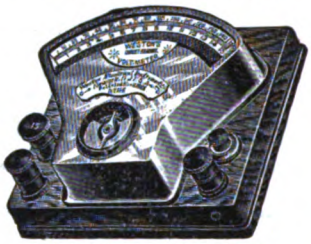
Paris, France—E. H. Cadiot, 12 Rue St. Georges.
Berlin—European Weston Electrical Inst. Co., Ritterstrasse, No. 88.
New York Office—74 Cortlandt Street.



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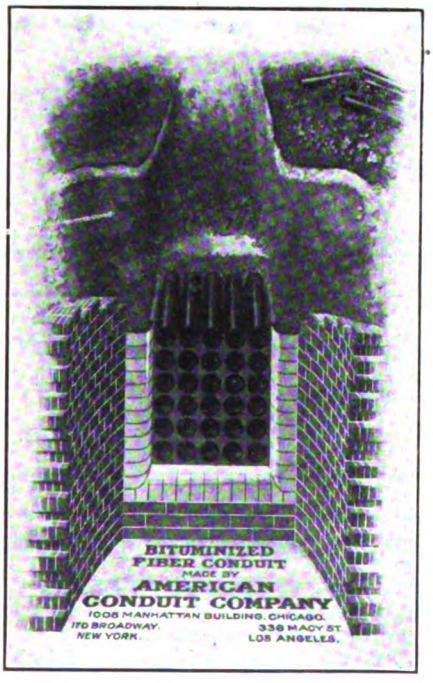

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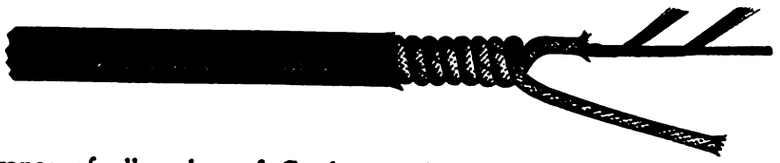

The general appearance of all makes of Cords are about the same, but when quality is taken into consideration there is a vast difference. "Eaco" Steel Switchboard Cords have the quality and give the service Exchange Managers are looking for. Our prices are right, our Cords are right. Send for sample.

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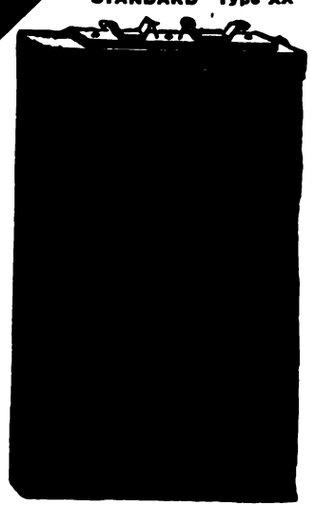

Are you figuring on improving the service of your telephone system, or are you going to go on in the same old way, with the same old annoyances, troubles and kicks bound to recur.

Instead of a faulty and poor service line, why not anticipate the complaints which are sure to come, and equip your line with

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By their use such things as "listening in" and the breaking of the circuit by leaving receivers off their hooks are made impossible.

They come in three styles—two illustrated herewith—and each style is *fully guaranteed.*

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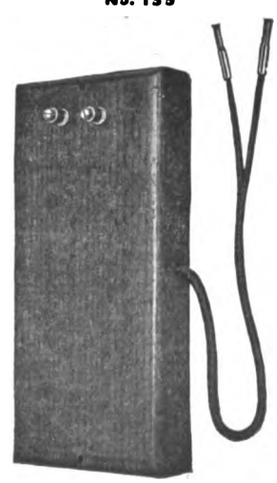

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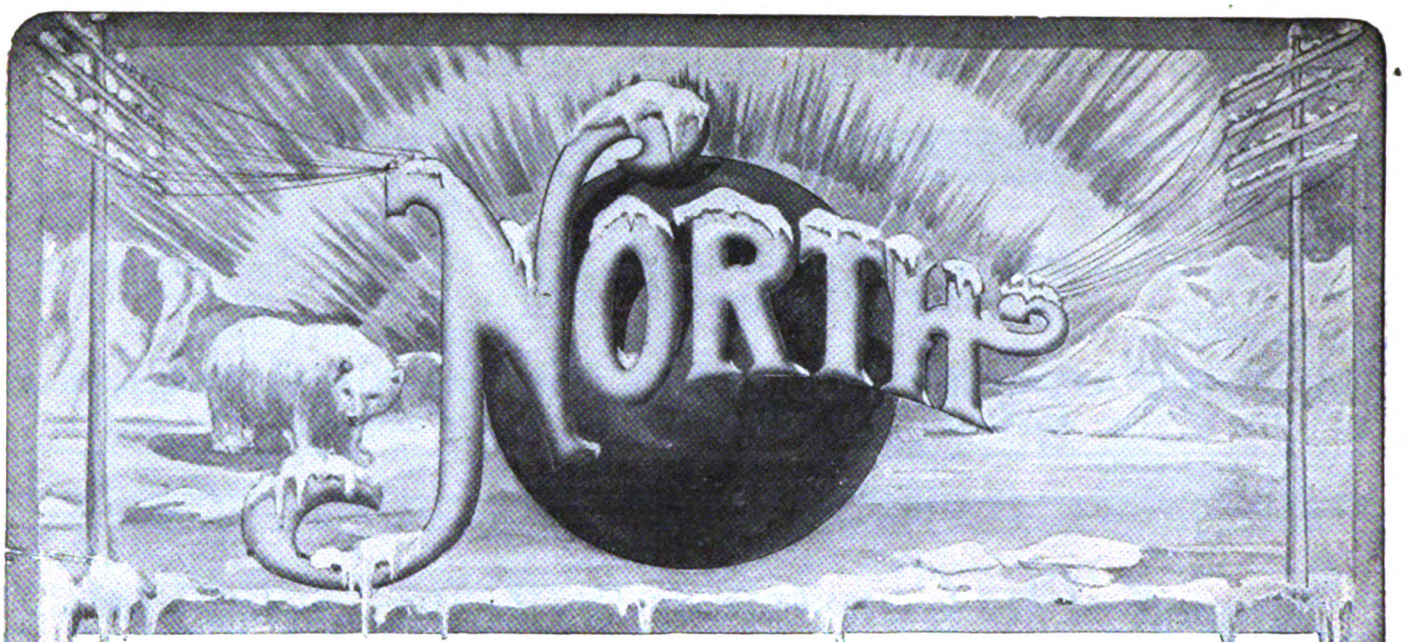

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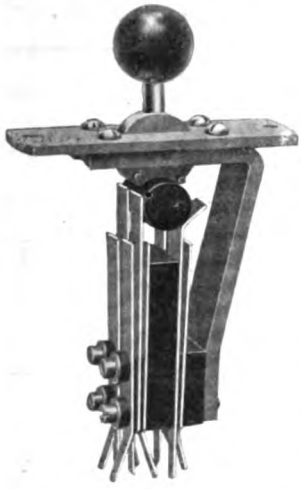


TO GIVE GOOD SERVICE,

it is necessary to have a switchboard that will give no trouble. One of the most essential parts of a good switchboard is a ringing and listening key.

We are illustrating the key used in our switchboards made by us. We have used the same type without any change for over five years. The first ones made are still giving perfect service.

All springs are made of German silver provided with platinum contacts. The insulation is of hard rubber.

This key will never give any trouble. Perfect contacts are assured at all times.

PERFECT PLUGS

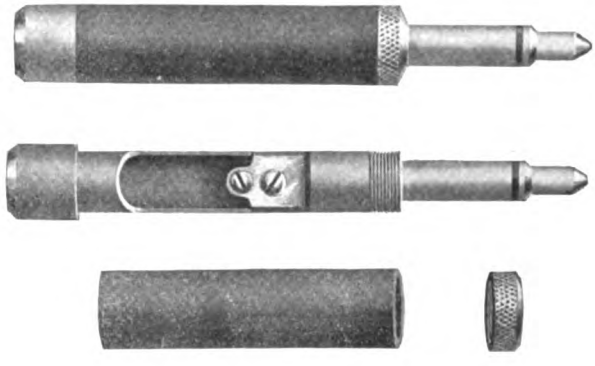
are as necessary as good keys---our plugs are made to accurately fit jacks.

The different parts of the plug are assembled so that it is impossible for them to ever become loose. This prevents the breaks in the insulation, which cause short circuits.

The insulation is of the best quality of hard rubber.

The sleeve is held on by a knurled nut which can easily be removed.

We will be pleased to submit samples of our switchboard parts for your inspection, local or common batteries.



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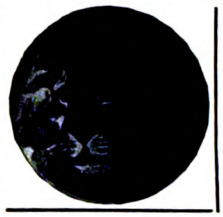


Little Things That Count

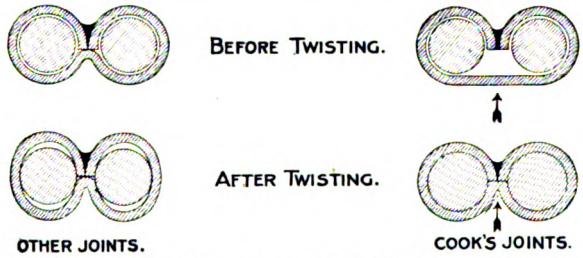
In MONARCH TELEPHONES the talking circuit is carried from the transmitter to the batteries by insulated cords. The ringing circuit passes through the hinges on the door, but these hinges are equipped with spring contacts as shown in the illustration. This feature positively precludes trouble from poor ringing contacts. A "LITTLE THING," and yet it counts.

MONARCH TELEPHONE MFG. CO., - - CHICAGO, U. S. A.

A PERFECT JOINT

The Cook Self-Welding Wire Joint

A joint made with the Cook Self-Welding Wire Joint is STRONGER THAN THE WIRE ITSELF



In the Cook Joint the mere act of twisting draws the sleeve into the recess between the wires, stretching it absolutely tight around both wires, making a perfect self-weld.

Send for a FREE SAMPLE, twist it up, cut it in two and see for yourself.

Air and moisture cannot penetrate and corrode the wire and joint. A perfect connection is assured by the use of the COOK SELF-WELDING WIRE JOINT. ALL SIZES. FOR COPPER OR IRON WIRE.

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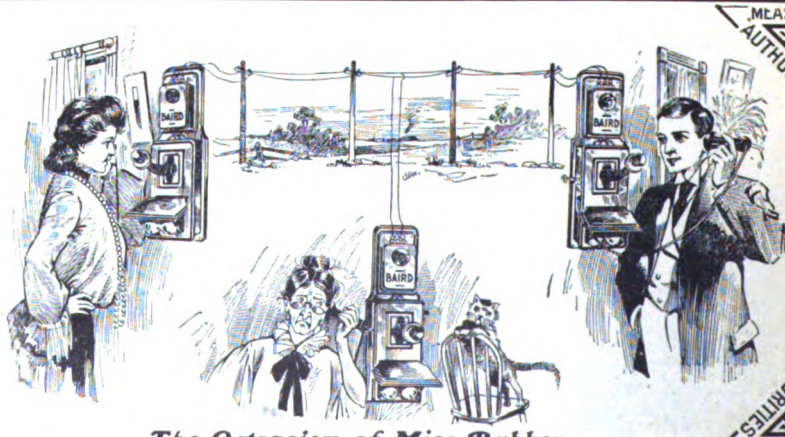

The Ostracism of Miss Rubber

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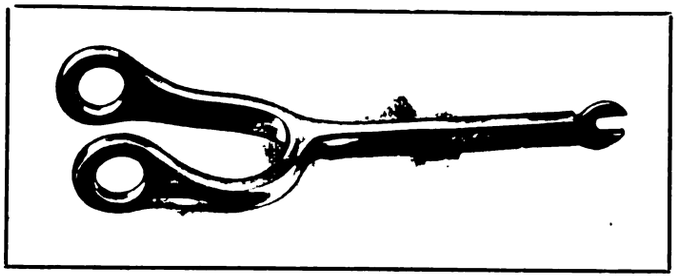
DEAN TELEPHONE APPARATUS



The accompanying illustration shows the

New Dean Removable Switch Hook Lever

It is made from one piece of **heavy sheet brass,** and is unbreakable, has the appearance of a solid metal hook lever, of the neatest possible design, besides eliminating the defects of the cast, punched and riveted hooks of other manufacturers. Great strength is insured in this hook lever by doubling the metal over, not only on the body of the lever, but in both prongs, making the latter very rigid.

This is only one of the many valuable features of the Dean Wall Telephones that will increase your exchange revenue and decrease your cost of maintenance.

THE DEAN ELECTRIC COMPANY
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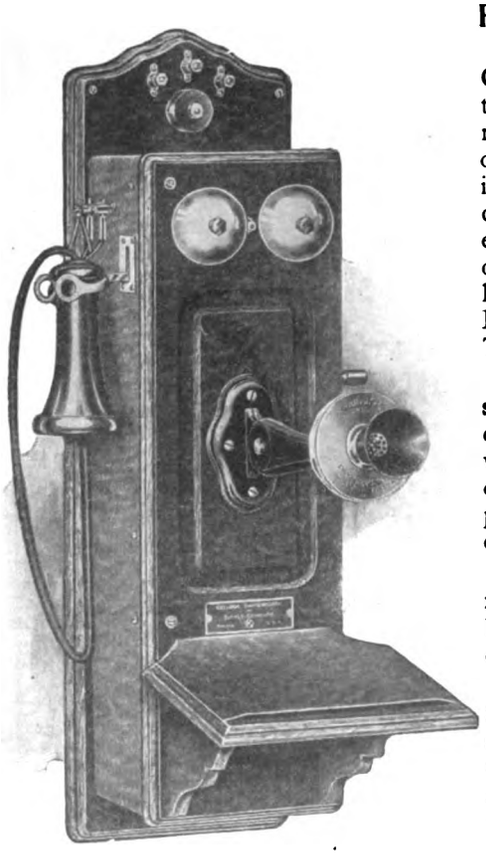
OUR No. 8 CATALOG TELLS YOU ALL ABOUT THEM BOTH



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Set No. 1303—With Grounding Key. With this attachment you can ring the other subscribers on your line without calling the exchange. Or you can call the exchange operator without ringing the other bells on the same line. SIMPLE—INEXPENSIVE — EFFECTIVE.

Set No. 1298—Condenser in the Secondary Circuit. Bells can be rung when all the receivers are off their hooks. Indispensable for heavily loaded lines.

Set No. 1274—Transmitter Cut-Out. Saves batteries and is a great convenience.

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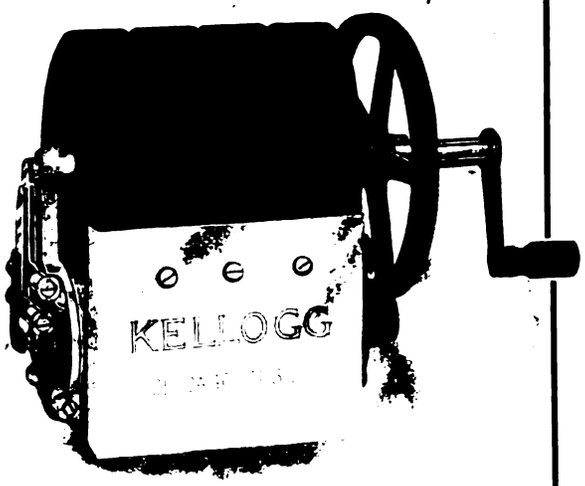

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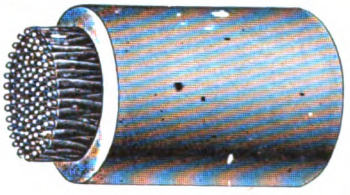

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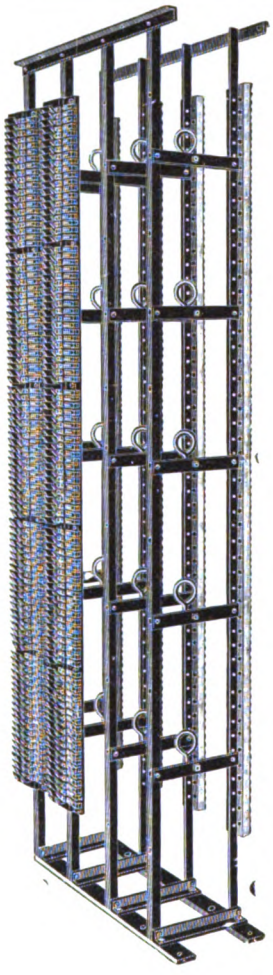

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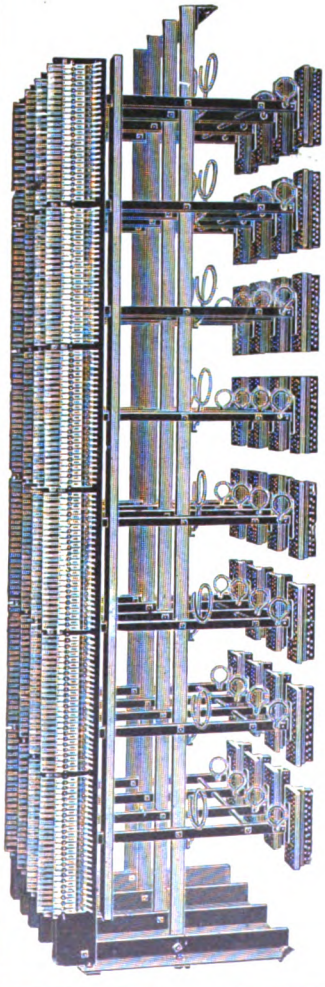

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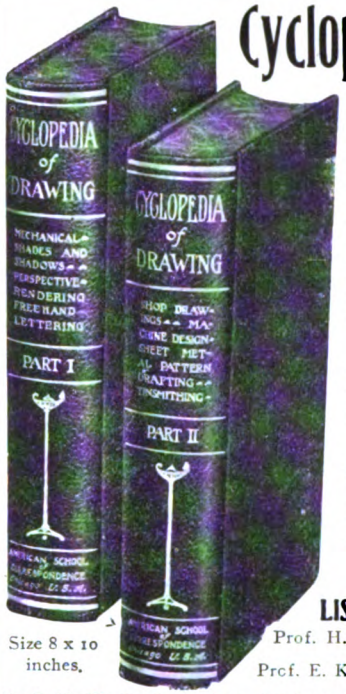

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INDIVIDUALITY

There are two kinds of individuality; that which means originality of conception and design without departure from that which is considered good practice; and that which stands for construction that is different from anything else without any improvements to recommend it.

An examination of the **Swedish-American** apparatus, illustrates the fact, that it is possible to depart from the old ruts into which telephone designers have fallen.

It will be found that all parts of their telephone are different from any others, but at the same time a definite advance in the art of telephony has been made.

Have you ever noticed the general similarity in the apparatus of all other makers? One might suppose that the ultimate goal had been reached and that there could be no further chance for improvement. Now compare any of the apparatus on the market with that of the **Swedish-American Telephone Company** and you will see that definite and apparent improvements exist.

For instance take the ringer movement. In others the only difference lies in the size of the screw holes, or perhaps, in the method of adjustment or some other minor detail. The general design is exactly similar in all of them. On the other hand the Swedish-American movement has been changed both mechanically and electrically, and in every way it differs from others.

It will be seen that the permanent magnet is mounted between the coils. The armature is in actual contact with the permanent magnet and is pivoted thereto. In the other forms the permanent magnet does not come closer than a distance of one-fourth of an inch. The permanent magnet greatly helps to increase the sensitiveness of the ringer movement. The closer the permanent magnet approaches the armature, the stronger the magnetic field. The stronger the magnetic field, the more sensitive the ringer movement will be. It is easy to see, therefore, why the **Swedish-American** ringer movement is 25 per cent. more sensitive than any other.

One does not see much change in the construction of transmitters of late. Everybody seems to be striving to get as close as possible to the Bell solid back transmitter and when they reach that goal they are satisfied.

It does not seem to occur to the designers that a transmitter better than the Bell can be made, so they rest on their laurels. It is an actual fact, however, that the improvements in the **Swedish-American** transmitter have made it greatly superior to the Bell long distance transmitter. It is just the same with all the parts of the telephone. You can see individuality in the lines of all the apparatus.

Take the generator for example. It has 30 per cent. more winding space than any other, and this means a 30 per cent. increase in the output. The induction coil is so mounted that an inexperienced person can replace it in ten seconds without soldering the wire and without danger of disturbing the circuit.

Their receiver is extremely sensitive and has an indestructible shell. Even the method of wiring is original with the **Swedish-American Telephone Company.** The wiring is arranged in the form of a cable, and each wire is insulated with a different colored material. You can trace any wire in the telephone by the color of its insulation without removing the telephone from the wall.

In these days of close competition, it does not pay to rest on your oars. You must keep a continual lookout for any improvements which will make apparatus more convenient for the customers and at the same time more efficient.

The **Swedish-American Telephone Company** is always looking for means of improving their output, and their customers are not slow to appreciate this fact.

Other points of individuality originated by the Swedish-American Telephone Company and copied by their competitors are:

A protector which covers the bell clapper.
Binding posts for the connections of the batteries.
All exposed metal parts insulated from the circuits
No hinge contacts.
Ringer and transmitter arm bolted on.
Receiver cord binding post inside the cabinet.
Receiver hook does not depend upon contact springs for tension.
Switch-hook perfectly self-contained.
All bridging telephones wired for condensers whether so equipped or not.

SWEDISH-AMERICAN TELEPHONE COMPANY
CHICAGO

AKRON, Ohio—
OAKLAND, California—
TACOMA and
BELLINGHAM, Washington

have all gone Automatic—Akron for 3,000 lines, Oakland for 5,000, Tacoma for 4,000 and Bellingham for 1,000.

Merit, absolute merit, was the reason why Automatic Telephone Equipment was selected by the Independent Companies in these cities.

They wanted the best, the very best, in telephone equipment.
They took their time and looked hard for it everywhere.
They found it in the Automatic.
That's where you will find it when you are ready to see it.
That's where the Independent Companies in all these cities found it—they adopted the Automatic:

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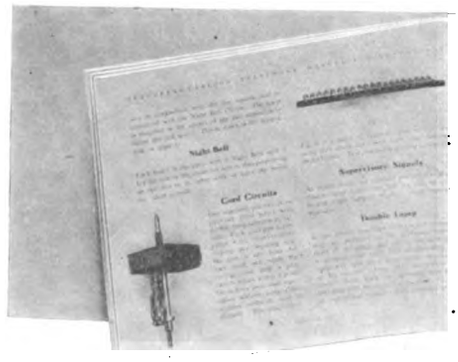

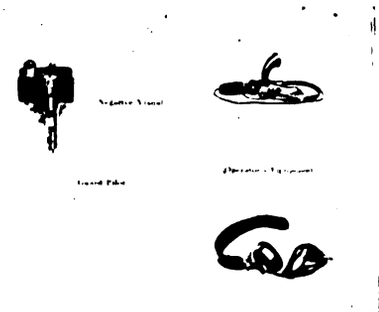

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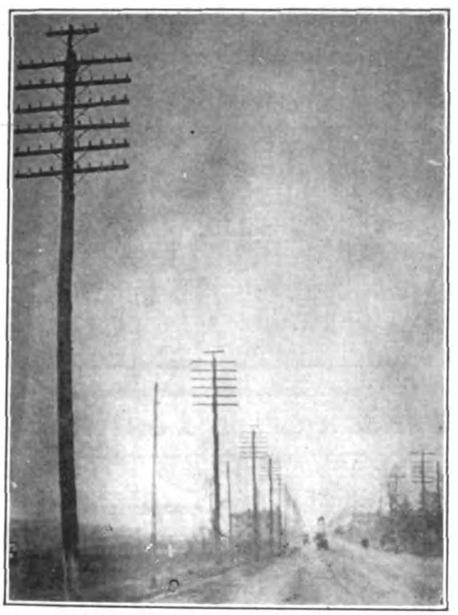
Open wire lines put up to stay and designed to reduce to a minimum the costs of maintenance and depreciation are excessively expensive. As the number of cross arms increase so does the size of the poles and every item in the bill for construction is increased proportionately. But after every precaution has been



An open wire line expensive to maintain, fifty foot poles, 8" tops, 20" diameter, four feet from ground.

Base of pole shown opposite. Note the comparison between it and the man.

taken, the continuity of open wire circuits is most uncertain. No matter how well the wires are installed, a sudden drop in temperature will cause them to snap and in one night sufficient damage can occur to eat up profits for six months to come.

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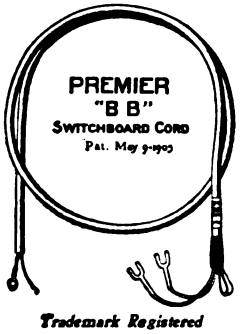

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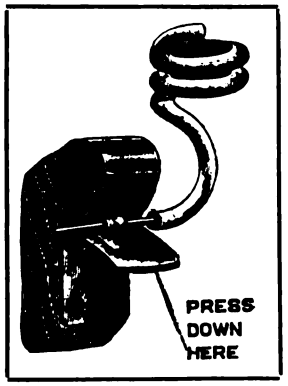

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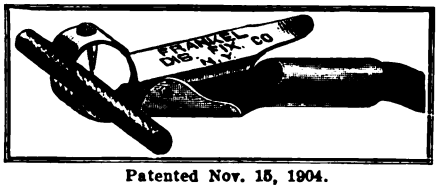

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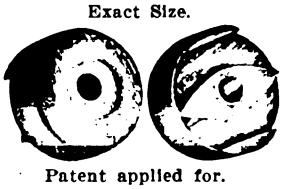

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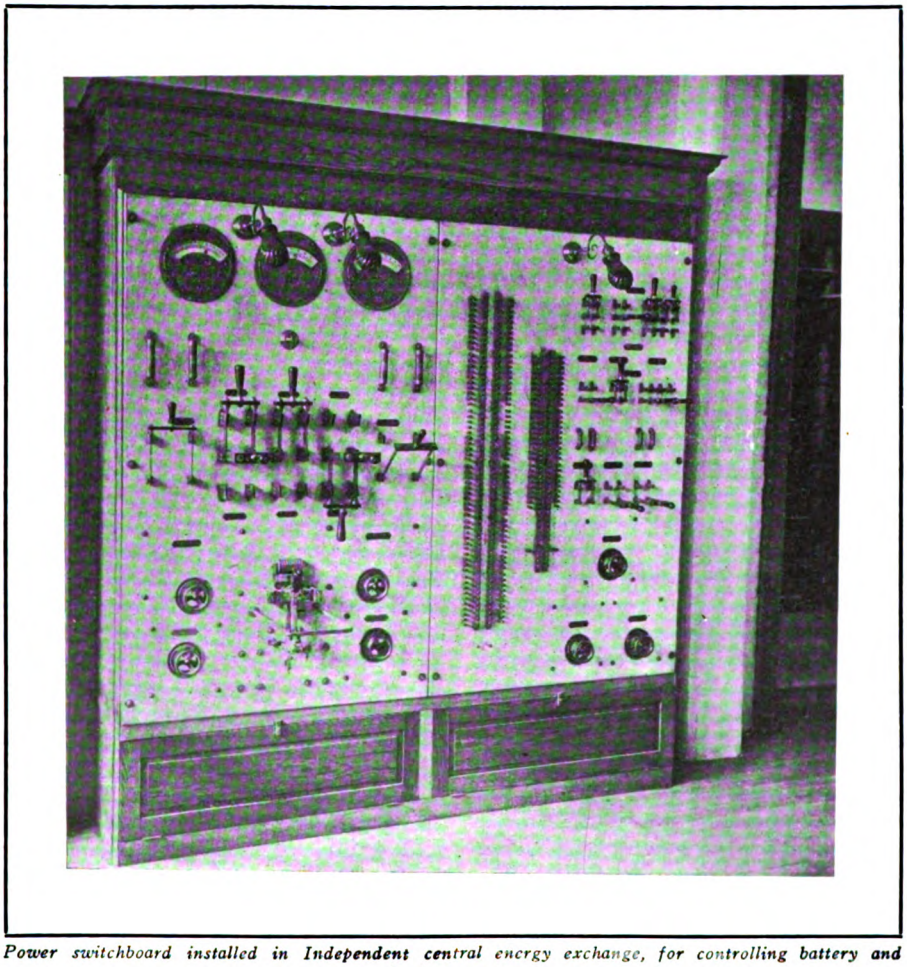
Power Data for Telephone Men*

By P. Kerr Higgins.

ON account of the large amount of power delivered, its dangerous voltage, and the fact that one side of the system is connected to ground, the electric railway system is of especial interest to the operator of a city telephone exchange.

Several systems of distribution have been introduced and may be classified as: The slot system, using an underground conduit; the overhead trolley; the third rail; the storage battery; the mono rail. The trolley system is conceded to be the best suited for average conditions and in the present state of the art is the only system for country use. In the larger cities there is a tendency toward the open conduit system, this being necessary in order to meet city ordinances requiring all wires to go under ground.

The storage battery system is an ideal one but the present development of the lead plate accumulator does not permit of its being made commercially successful. Nevertheless there is a bright future ahead of this system when the weight and delicate nature of the present form accumulator have been done away with in an improved type. That the slot system will eventually replace the overhead trolley in the cities is certain and very desirable because it avoids unsightly encumbrances in the streets of the city and from the standpoint of public safety. The mono or single rail system is beginning to make considerable progress in this country, having been made a success in Europe. It is now being agitated for a line between Los Angeles and Ocean Park, a distance of over twenty miles, a permit having been obtained for an experimental line between Ocean Park and Santa Monica, California.



Power switchboard installed in Independent central energy exchange, for controlling battery and ringing current.

The consideration of the method of supplying and delivering energy to drive the cars affords an interesting contrast to the small amount of power used in a telephone exchange. To get some idea of the power necessary, we find that to propel a car weighing one ton along a set of rails at a speed of 15 miles an hour means 2,000 lbs. moving at a rate of 1,320 feet per minute, which means 1,320 x 2,000 or 2,640,000 foot lbs. per minute; 2,640,000 ÷ 33,000 is equal to 80 horse power, one horse power being equal to 33,000 lbs. per minute. This would be the horse power necessarily furnished by the generators under perfect conditions, that is with absolutely no loss, a condition which never exists. It is therefore safe to say that it would take ninety horse power to do this work.

If this speed is increased, more horse power is necessary to neutralize or overcome the increase in wind pressure, created by the moving car. The electrical energy put into the motors to provide mechanical power is measured in watts. The action actually taking place is a series of pulls and pushes between the armature and the field of the motor and these must be properly proportioned to the speed desired.

The motor equipment of a car may be divided up into units, e.g., if 250 horse power is required it may be divided between two or more motors, the number used being dependent upon the design and space available on the car body, and also the service desired. The watts are equal to the total horse power x 746 and this result divided by the voltage gives the amperes at full load. The watts are calculated upon the consumption per second, but the foot pounds ultimately given out is rated similar to a gas or steam engine horse power.

The overhead trolley system is the most frequent source of disturbances in a telephone exchange. In such a system, as is known, the current is fed to the car motors from a trolley line, along which a pulley attached to the trolley rod runs. The vibration of this wheel with its makes and breaks is a frequent source of noise on unbalanced telephone lines. The trolley wire is generally of No. 0, B. & S. gauge, supported and insulated above

*Continued from the issue of March 24th.

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the tracks by means of poles and bracket supports. In order to maintain a uniform difference of potential along the entire route, feeders are run out and tapped off to the trolley at several points. The trolley wire is of hard drawn copper wire stretched along the entire track from pole to pole. The arrangement of the brackets on the poles is such that while supporting the trolley wire, they nevertheless leave it more or less flexible to prevent the trolley from being bent out of shape by the pressure of the trolley rods and wheels. The amount of current consumed by a car varies from 50 to 150 amperes according to load and speed, hence the necessity for keeping down the loss to the minimum. A fall in potential means slowing up of the speed of the cars and dimming of the lights in the cars.

The current leaves the generator station and travels along the trolley, enters the car system through the trolley wheel down the rod to the controller to the motors, thence to the rails and back to the generating station. The motors commonly used are what is known as the series type in which the pull increases as the current increases and decreases as the current falls; the speed also increases as the E. M. F. at the armature terminals is raised and vice versa. The controller is so arranged as to connect the motors up in series, in parallel, or series-parallel. By means of this controller, the current supply is controlled and the speed and power regulated. The importance of keeping up the voltage and consequently the current is seen; it is apparent if several cars are on the same section and each consuming 100 amperes, the voltage under these conditions being the current × the resistance which in such a large wire is very small, a serious fall of potential could easily take place were it not for a proper distribution of the cars and a judicious use of feeders. The use of these feeders constitutes a large investment.

One of the most important features, from the standpoint of telephone men, in addition to inductive disturbance, is the feature of electrolysis which is frequently due to bad bonding, resulting in loss of power and electrolytic action on lead cables and pipes in the ground; the same rule applies to bonding as to the distribution of feeders, the result of both being loss of current. It was for a long time customary to use fish plates, but lately a welding process has been introduced which produces very much better results. This bonding is an important feature of street railway work from the standpoint not only of the railroad company but of those companies using conduits containing factors of metal, such as iron or lead. In the operation of the system many such defects very rapidly use up the pressure, due to poor electrical contact, this being especially noticeable when a large amount of current is required. The rails are really a set of conductors used for returning the current to the power house, and if not returned it will be distributed to the earth and return back to the power house by way of any good conductors in the ground (such as lead cables or iron pipes) and electrolytic action takes place under such conditions. It is thus seen that the energy which is not conducted back is a positive danger to conductors in the earth used for any purpose. This leakage can be easily explained by a reference to Ohms law, in which we find that the current is directly proportional to the voltage and inversely proportional to the resistance. The action may be explained in the light of an accumulator, such action being similar to a secondary battery, the rails forming one pole, the ground being the electrolyte and the cable sheath or iron pipe the other pole and the metal is likely to be carried from point to point of the attacked conductor as shown by its honyecombed condition.

The motors of a car may be connected up in many different ways, all of which form themselves under two main groups, series and parallel. Under the first group we find them subdivided as follows: In series with more or less resistance; in series without resistance; in series with each other and fields shunted. Under the other group we find similar external conditions, only the motors are in parallel instead of in series. The governing of these several conditions is accomplished by the manipulation of the controller. Three factors must be considered in the design of all motor equipment. These are acceleration, weight, and rate of speed. The controller is well named, being the controlling factor in each of these elements. This instrument is, in reality, a manipulator of the circuits governing the starting, running and stopping of the car, and these results are obtained by a gradual cutting out of resistance and the effecting of the above combinations in the controller, which are intended to start up the car gradually and avoid the jerk. The fundamental principle in the design of the controller is gradually increasing the volume of current passing through the motors, by an arrangement whereby the armatures, fields and resistances are gradually changed from being in series to being in parallel.

All that has been said heretofore applies to the average traction line which uses a direct current of 500 volts. Of late, however, the trolley systems have been broadening and expanding until we now have long enough lines to require the use of sleeping cars and the old direct 500 volt system will not serve under the new conditions. These conditions introduce the necessity for a sub-station, more or less remote from the main generating station, and the longer the line the more sub-stations are necessary. This means the transmission of current to the transformers at the sub-station at a high voltage, which necessitates high insulation all along the line. There is being introduced on systems of this nature the feature of alternating currents, and it is felt by many who should be competent to judge that single phase alternating current is what will be mostly used in the future. The present practice is three phase alternating current using rotary converters, but this is too complicated to permit of future developments on long lines. It is apparent that on such systems enormous voltages have to be used and when these parallel telephone lines they are bound to pump more or less induced currents into them, producing noisy lines.

Special insulation of high voltage circuits is very necessary on account of their ability to arc across space. The insulators used are commonly about five inches high and five inches at their greatest diameter and when entering or leaving the power house, etc., the wires are carried through a terra cotta pipe eight, ten or twelve inches in diameter. These insulators are tested for a minimum of 20,000 volts. A second insulation is also provided cemented to the first, tested to a voltage of 40,000 volts. Telephone lines run on same poles should be placed below the bracket arm so that in case of a break it could not fall on the bracket arms. In the construction of high tension lines, they should always be run over the telephone, as the liability of the heavy wires to break is less than the light telephone wires. Some companies have also put in, on the span crossing other lines, a device for automatically disconnecting the wire about one foot from the cross arm on each side of the crossing, so that should the line break down the piece of wire between the point of breaking and the automatic cut out would be dead. This device consists of a hook under tension so that when the tension is withdrawn, a spring disengages the hook and opens the circuit leaving only the stub of the wire on the pole. The whole device is placed inside a hood cover for protection.

The function of the rotary converter is the transforming of alternating into direct or continuous current at the receiving end of a transmission line, or the changing of low voltage alternating current into high voltage alternating current by transformers at the transmitting end. An illustration of this may be given, as power originating in an alternator (3 phase) 500 volts, enters the transformer being raised to say 5,000 volts, at which pressure it goes to the line, travels over it and so enters the step down transformer at the receiving end, stepping down to 500 as at first; the current is however still alternating in character, in which condition it enters the rotary converter and comes out at 500 volts continuous current. Another combination can be made starting with 220 volts direct current through rotary converter, from which it comes out 3 phase 500 volts alternating; it may then enter a 3 phase step up transformer to 5,000 volts to line; arriving at the sub-station or receiving end it enters a step down transformer and comes out 500 volts; passing through another rotary converter it comes out 220 volts direct as at the beginning. We will now consider the transformer. The alternating trans-

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former consists of a magnetic circuit, containing two direct coils, termed high and low pressure coils; the employment of a coil will transform the pressure higher or lower according to the coil used, in either case the watts remaining practically the same. In the illustration given it will be noted that two styles of transformers were mentioned, step up and step down.. Transformers are designed specially for these purposes. In designing transformers one turn of wire is used for each volt used, e.g., 220 volts would have 220 turns of wire. The ratio or difference between the primary and the secondary is termed "the ratio of transformation," e.g., 220 on primary and 440 on secondary would be a ratio of 2 to 1.

The necessity for care in handling wires which come in contact with these high potential circuits is obvious. Shocks from 110 volt circuits seldom, if ever, affect any one seriously; the feeling being slightly of a prickling nature, with slight contraction of the muscles. At 220 volts a similar feeling exists but more intense. In all cases the feeling and effect of an electrical shock varies with different persons and the condition of the skin, whether dry or moist, at the time of receiving the shock. The shock from an alternating current, even an ordinary hand generator, is much more severe in its effect than direct current of a similar voltage. The necessity, therefore, of being especially careful with alternating currents is apparent. The resistance of the average human body is about 2,500 ohms and varies from this up to 5,000 ohms. It may here be noted that it is not the voltage or pressure but the amperage or current that produces death; the one of course is productive of the other, but the current is the fatal factor. From this it is apparent that there is less danger in the voltages running into a hundred thousand than in the lower ones, for the reason that the higher frequencies associated with such high voltages tend to very greatly increase the resistance of the body and so the current encountering resistance internally is likely to pass off to ground or return on the surface only and while stupefying in its effect is less liable to be fatal. It is therefore extremely important in the handling of all electrical apparatus to open the main switch on the circuit to be tested or repaired before any work is done. If, however, this, for any reason, cannot be done, then great care should be had to handle only one conductor at a time and avoid any part of the circuit at a different potential from this point; the use of rubber gloves and shoes in such a case is also absolutely necessary. So far as possible work with one hand only, keeping the other at your back or in your pocket. This precaution carried out several times easily becomes a fixed habit.

When high tension is used always be on the lookout for leakage on poles, cross arms, etc., which is frequently present and dangerous; to this end before doing any work on such systems with live conductors one should see that he is properly insulated from ground and other conductors. The effect of an electric shock on the human body first attacks the nervous system and causes spasms, followed by burning of parts of contact due to electrolytic action and all the symptoms are those of suffocation from drowning and the same methods for resuscitation are employed by producing artificial breathing. If relief can be had at once the chances are that the sufferer can be brought back to consciousness. Those taking part in releasing one receiving a shock must be very careful to protect themselves from contact with the body unless they are sure the current has been shut off. Use rubber gloves in all cases, if possible, or wrap hands in thick layers of paper and stand on some good insulator. If oxygen gas can be obtained some should be pumped into the lungs of the sufferer, but in no case should stimulants be poured down the throat, as this is injurious.

The Ohio Convention

By L. A. Parrish.

LARGE attendance and enthusiastic and useful discussion of many problems made the third annual convention of the Ohio Independent Telephone Association at Columbus one of the most satisfactory meetings ever held by Independent telephone men. Delegates and officials numbered 300, of whom 283 were in actual attendance. Interested telephone investors and non-members, with manufacturers' representatives, probably made the number over 400, while other interested parties and friends of delegates made a total of those who at one time and another attended the three sessions easily as great as 500.

Interest in the proceedings was intense and by every indication available the practical observer could judge that the morale of the Independent forces in Ohio is unexcelled and its fighting force is available in every unit for continued battle. The actual investment represented in the association is estimated by President Frank L. Beam to be over $30,000,000, while the apportionment of delegates at one per 1,000 telephones would indicate in the neighborhood of 262,000 instruments in use.

The convention, a one-day session, with evening banquet, was opened Thursday morning by President Beam, who introduced Mayor Dewitt C. Badger, of Columbus, to welcome the convention to the city and to turn over key and latchstrings to its members. In a happy address Mayor Badger convinced his audience that the city was delighted to have them in its midst and was perfectly willing and anxious that the delegates should thoroughly enjoy their stay.

J. C. F. Hull, president of the Second National Bank, Bucyrus, responded and thanked Mayor Badger and the city of Columbus for the gracious reception extended the association.

President Beam's annual address touched on the growth of sentiment in favor of the Independent movement as shown by the fact that formerly no news relating to it would be published, while now the fullest news is given and the people gladly read it, because there are over 25,000 stockholders distributed in all the communities and over 250,000 subscribers in close touch with the system.

President Beam showed that twelve years ago the Bell Company had fewer than 50,000 telephones after eighteen years of undisputed sovereignty in the Ohio field. One year ago the Independents had approximately 190,000 in use, and to-day over 250,000, a gain in twelve months of 60,000, or more in one year than placed by the Bell in the first eighteen years. To-day the Independents have 367 incorporated companies, with an actual investment of over $30,000,000, in Ohio. This, President Beam stated, is the invincible argument in favor of maintaining the association which, by combining power, had swamped a wealthy monopoly and rescued the telephone from the service of the rich and placed it in reach of all.

The report of Secretary-Treasurer Ralph Reamer showed the number of telephone companies eligible to become members of the association to be 325.

The following committees were appointed by President Beam:

Auditing—J. D. Johnson, Celina, chairman; J. B. Rhodes, Zanesville; C. L. Norton, Cleveland; C. H. Hollander, Newark.

By-laws—Dwight E. Sapp, Mount Vernon; W. L. Cary, Cleveland; G. P. Thorpe, Cleveland; A. H. Doudna, Bridgeport; S. Crosby, Wooster.

Finance—C. Y. McVey, Cleveland, J. S. Brailey, Jr., Toledo; G. R. Johnston, Columbus; W. G. Thompson, Hamilton; E. L. Barber, Wauseon.

Grievances—W. P. Bogardus, Mount Vernon; Washington Hyde, Warren; F. A. Knapp, Bellevue.

Nominations—W. F. Laubach, Akron; I. H. Thiedieck, Sidney; J. S. Devore, Bryan; J. B. Hoge, Cleveland; Colonel W. D. Rush, Greenville.

At this point in the proceedings C. Y. McVey, of Cleveland, announced that he had received information that the Senate was then in session and that there was danger that the Howe bill,

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which levied additional tax on telephones, would be taken from the calendar and passed, in which event it would become a law, as the House had already passed the measure. Mr. McVey moved that a committee of five go to the Senate immediately to try to head it off. President Beam explained that the amount added annually to the taxes of the Columbus Citizens' Company had been calculated, and it would amount to a fraction of a cent under $1 per telephone. It was a bill in which the value of the Columbus Citizens' equipment would be subtracted from the capitalization and a little over one-half per cent tax laid on the difference. An amendment made the committee to consist of nine members, and the motion was adopted. The committee appointed consisted of G. P. Thorpe, Wilmington; James S. Brailey, Jr., Toledo; J. C. F. Hull, Bucyrus; B. C. Hendrickson, Medina; C. D. Juvenal, Springfield; W. H. Baum, Batavia; W. F. Laubach, Akron; J. S. Devore, Bryan; W. W. Fisher, Bellefontaine. The convention entrusted the committee with the following resolution, offered by Mr. Laubach and unanimously adopted:

"Resolved, That it is the sense of the Ohio Independent Telephone Association in convention assembled that the Howe House bill should be defeated on the ground that it is unwise, inexpedient and obnoxious and a menace to the Independent telephone interests of Ohio."

James B. Hoge, of Cleveland, president of the National Interstate Telephone Association, then addressed the convention on the subject of the progress and development of the national association. The address was accompanied by maps of the country and of Ohio, and with diagrams illustrating the main points. He asserted that there are 3,200,000 Independent telephones working to-day, representing an actual expenditure of over $300,000,000 in cash. The story of the rise and progress of the Independent movement is marvelous. In the cities the development is wonderful. In Cleveland for the past two years it has been 500 telephones a month, and at present it has risen to 1,000 a month. The Columbus Citizens' Company is growing at the rate of 500 a month. The Frontier Company, at Buffalo, is growing at the rate of 500 to 750 per month, and Philadelphia is reaching out over 1,000 per month. The story everywhere is the same. He said the "Ohio plan" is well spoken of everywhere and is being adopted.

In the morning session W. B. Woodbury, of the new Detroit company, reviewed briefly the history of the Independent company in charge of which he is now placed. He insisted that there should be no temporizing or flirting with the Bell people, but they should "be licked and licked good." He scored the "lying, underhand" methods of the monopolists in Detroit, and said they were unavailing, for he had 1,000 contracts in the safe at his office, and they were rolling in at the rate of from 40 to 75 per day. He said the Bell arithmetic was not good, for they had reported everywhere that 98 per cent of the tenants of the Majestic building, one of the greatest office buildings in America, were not in favor of a double system and were refusing to listen to the new company's agent. Independent arithmetic showed that 40 per cent of the tenants of that same building had contracts for the Independent telephone, and he had the contracts in his safe when the lie was floated.

Mr. E. L. Barber reported to the convention the situation in the South. He praised the Ohio plan and said that his experience in Ohio had given him power and that he had used the same tactics there. Mr. Barber said they would have a new line through to the Gulf within four months, and a new six to eight copper line to Mobile. In Kentucky they had formed a holding company for the small companies liable to be gobbled up by the Bell and to meet the same tactics which had to be knocked out everywhere.

The "question box" was opened in the afternoon session, the first query being: "Are telephone securities a better investment to-day than they were two years ago? If so, why?" A significant thing is that the first question was abandoned as requiring no answer by all the speakers, and each tried to answer the second and show "why." W. G. Thompson, of Hamilton, led the discussion and gave the credit of the advance in securities to the Ohio plan of consolidation. Dwight E. Sapp, of Mount Vernon, showed that the Columbus Citizens' Company common stock is now at par and that bids of 112 do not bring out any of its preferred stock. He said that recently, within the space of six weeks, the entire issue of Newark telephone stock was absorbed in the local market at par and premium.

President H. A. Lauman, of the Columbus Citizens' Company, gave a historical talk relative to how he and others invested in the system. He said that now investment was reasonably certain of 6 to 10 per cent on telephone securities, and he ascribed this to the principle of "E Pluribus Unum" as illustrated in the growth of the United States coupled with confidence in the stability of the system.

H. P. Folsom, of Circleville, paid a tribute to President Beam and said that much of the success is due to him and the principle that if we help one another we help ourselves. He said President Beam had been called in to doctor many a decrepit telephone company about to be gobbled by the Bell, and so far the doctor had not lost a single patient.

Judge Lewis Brucker, of Mansfield, and President Ford, of the Independent Company of that city, also spoke.

In reply to the next query, "What is the remedy for State legislative interference?" James S. Brailey, Jr., of Toledo, said the association must go into politics, must send friends and even its own members to the Legislature. He explained the Howe bill by saying that if a telephone company had $1,000,000 stock and $1,000,000 bonds outstanding, a total of $2,000,000, and its assessed valuation were $500,000, the difference, $1,500,000, would be assessable at $6 per thousand, or in that case $9,000 annually. In Mr. Brailey's opinion the telephone companies pay enough taxes when they pay 1 per cent of the gross receipts and ordinary taxes on equipment and plant. It discriminated against the Independent companies, for it would never catch the Bell, whose stock and bonds in the State would never exceed its taxable value and hence there would be no difference to tax. He advised the association to keep in close touch with the Legislature.

H. P. Folsom, of Circleville; O. F. French, of Cleveland, and Wm. S. Peters, of Delphos, thought great benefits had accrued last year and two years ago in discussing the questions of standardization, accounting and other questions.

A. C. Davis, of Parkersburg, secretary of the West Virginia Independent Telephone Association, gave a résumé of the condition of telephone affairs in his State.

Judge Brucker, of Mansfield, gave a history of the trouble between the Ashland people and the Mansfield people because the Ashland people cut in on the Bell exchange and toll line while holding with the Independents. This was denounced in unmeasured terms by several delegates, who said it was a mistake for Independent companies to flirt with the Bell. "If the Ashland people will not give up the Bell, let us cut free from the Ashland people," was a sentiment loudly applauded. Secretary Davis said radical measures of this kind had straightened out a similar matter in his State and had brought two rebellious Independent companies to terms. He quoted the constitutional provisions of the West Virginia association and said all such disputes were settled before any company was allowed to enter the association.

W. F. Laubach, chairman, filed the report of the nominating committee. It was recommended that the duties of secretary-treasurer be divided. The report of the committee was accepted unanimously and voted equivalent to an election of the officers named. These are as follows:

President, Frank L. Beam (third term); secretary, Otto O. Welsheimer, new district manager for Ohio of the United States Telephone Company, stationed at Columbus; treasurer, Ralph Reamer (re-elected second term); delegates to national convention, E. L. Barber, Wauseon; James S. Brailey, Jr., Toledo; Lewis Brucker, Mansfield; I. H. Thiediecke, Sidney; J. C. F. Hull, Bucyrus; W. G. Thompson, Hamilton; J. H. Metheany, Lima; W. W. Morrison, Toledo; J. B. Rhodes, Zanesville; G. P. Thorpe, Wilmington; J. B. Hoge, Cleveland; Dwight E. Sapp, Mount Vernon; F. L. Beam, Columbus; Cyrus Huling, Columbus; O. F. French, Cleveland; G. R. Johnston, Columbus; W. F. Laubach, Akron; E. L. Coen, Vermillion; Leo Fleisch, Piqua;

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L. H. Beatty, Ravenna; Washington Hyde, Warren; H. P. Folsom, Circleville; J. C. Reber, Dayton; J. M. Saltzgaber, Tiffin.

Mr. Thompson, Judge Brucker and Mr. Ford were named a committee by the acting president to escort President-elect Beam to the chair, where he made an address thanking the delegates for the honor conferred and thanking the officers for their thorough loyalty to him. George W. Beers, of Indiana, closed the convention with a short address on the Cincinnati situation.

At night about 200 delegates and friends sat at banquet at the Hartman, Hon. Harry M. Daugherty, of Columbus, being toastmaster. A fine spread, plenty of good music and a genial company were features. Walter B. Richie, of Lima, responded eloquently to the toast "Ohio's Future," and the play of wit between him and the toastmaster was very pleasing to the guests.

Judge C. B. Matthews, of Cincinnati, gave a clear statement of the "Cincinnati situation," and Frank A. Davis, of Columbus, responded to "Why we should maintain a State association." Colonel J. D. Powers, Louisville, Ky., responded to "The general telephone situation as viewed from a neighboring State."

Standing with bowed heads and sincere respect, the delegates and guests silently drank in clear, cold water a toast, "The Governor of Ohio Lying on His Bed of Pain—May He Be Restored to Us."

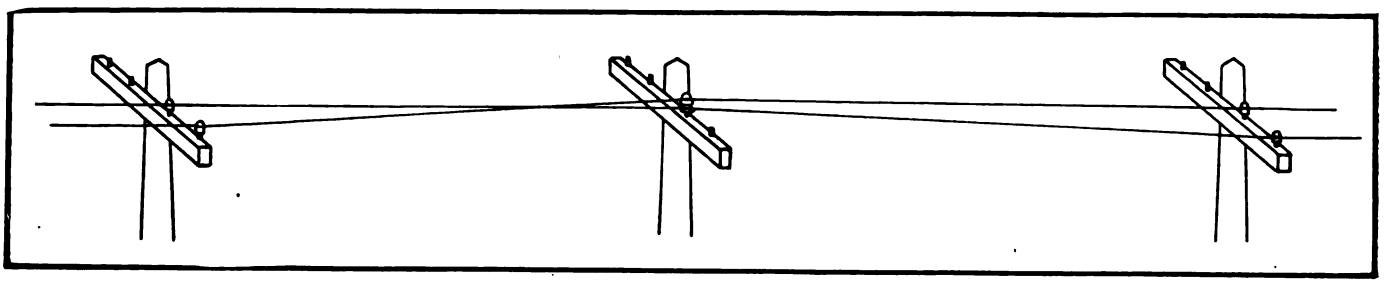
Late at night the banquet closed with hearty expressions of pleasure by the guests at the very successful event it had celebrated.

A Single Pin Transposition

By William Laneau.

THE accompanying illustration shows a method of transposing wires which presents several advantages over the old style double pin form. The old style transposition is too convenient for carelessly cut in "test stations," that soon develop into "cut outs" and "noisy lines" from bad connections, when made by linemen in a hurry.

The new style is no easier to cut than any other portion of line, so linemen will usually refrain from cutting in "test stations" where they are not authorized.



By the Use of a Double Grooved Insulator a Transposition can be Made on a Single Pin, Which is Much More Satisfactory than the Double Pin Transposition.

With the old style transposition there was usually trouble from broken pins, due to unequal strain of wires. Also it frequently happened that linemen in working on poles would carelessly place a foot or knee on the upper wire causing it to come in contact with the lower one, making a temporary loop cross.

In addition, the old style transposition was never a thing of beauty, however neatly made, and unless "run in" as the lines were being constructed, necessitated the cutting of each wire and insertion of three and sometimes four joints for each transposition.

With the new style the strain on the pin is equalized, consequently trouble from broken pins is eliminated. It is impossible for careless linemen to cross the wires at the transposition and the general appearance of the whole line is improved. It may be objected that the unused pin looks bad, but this can be remedied by placing an insulator on that pin. In this connection an amusing story is told of friction between departments.

A new line was erected by the construction department and a single pin transposition used, with unused pin left without glass. The maintenance inspector reported that the new line had not been properly insulated, and a construction man was sent over line. He reported that all wires on poles were properly insulated. The maintenance inspector reported again the absence of glass insulators on the wire, and a construction man was again sent over line to place glass where needed. On his return he reported as before that all wires on the line were equipped with glass. This happened several times, with consequent correspondence between the Superintendents of Construction and of Maintenance until feeling between them got rather warm. They then decided to go over the line together and on so doing the Superintendent of Construction was able to show the Superintendent of Maintenance that all wires were properly insulated. Although the unused pin with no glass had no wire attached, to prevent further reports from incompetent maintenance inspectors, insulators were put on all unused pins.

To cut in a new style transposition, tie as illustrated, then cut on pole on either side of transposition pole. This makes the best looking job, but the cut can be made on transposition pole if necessary. Cut long ends on two wires and insert pieces on the other two.

EXPERIMENTS IN THE PRESERVATION OF TELEGRAPH AND TELEPHONE POLES.

ACCORDING to *Forestry and Irrigation*, seven electric companies in California have made arrangements with the United States Forest Service for a thorough co-operative study of seasoning and preserving telephone and telegraph poles. The work centers at Los Angeles, where an agent of the Forest Service will be stationed to make tests under the government authority.

Oregon cedar is the tree chiefly used in this region for poles. The experiments will be devoted not only to the handling of this wood, but to a search for satisfactory substitutes among other species. Possible substitutes are Western yellow pine, incense cedar, redwood, and eucalyptus. The comparative value of these will be studied, and those which promise best will be subjected to such seasoning and preservative treatment as the Forest Service may recommend. In general, the wood will be handled in much the same manner as that which has proved successful in other work done by the service.

In Pocahontas County, West Virginia, also, the Postal Telegraph-Cable Company has established a camp for the cutting and treatment of chestnut telephone poles. The cooperation of the Forest Service was asked by the company to devise methods of seasoning and handling poles. The recommendations for seasoning, which have already been made, have been adopted by the company.

A number of poles are to be soaked in water for about thirty days, to hasten seasoning. Other poles will be air-seasoned without soaking. The value of soaking will be demonstrated by a comparison of the results of these two methods.

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The Standardization of Construction

By Frank B. Hall.

ALTHOUGH strong arguments against the standardization of apparatus have been advanced, principally on the ground that it would tend to discourage the development of improvements, there are no such reasons existing why line construction should not be standardized as far as possible. None of the arguments advanced against the standardization of apparatus would apply in this case, and it is probable that the managers, construction men, manufacturers and supply dealers alike would welcome the change if it could be brought about.

You have no doubt noticed in your travels the many different methods and styles of construction work on exchanges and toll lines throughout the country.

One exchange will have heavy, strong poles, well set, but equipped with light cross arms, while the next is as likely as not to have slender, light poles, few and far between, and equipped with heavy standard cross arms. The one will be guyed to anything on which a guy wire can be attached; the other will possibly be strongly guyed and anchored. One will have galvanized hardware, while the iron work attached to the other will be plain or a mixture of both will be found. The line wire used in different exchanges is of all kinds and gauges. The same conditions apply to toll lines.

This condition has in few cases been brought about by a desire on the part of the investor to practise false economy. In other instances lack of experience and the abnormal growth of the business are largely responsible, as pole lines that were originally intended to accommodate a few wires are now called upon to support aerial cables and many cross arms full of wires.

The description I have here given must not be construed as applying to all Independent construction, as there are many extremely well constructed and equipped exchanges and toll lines. Nevertheless there are many exchanges throughout the country which will in the next few years be compelled to reconstruct their outside plants either wholly or in part. There are no progressive companies that are not continually making some extensions. The toll lines, which are the medium that will eventually cement all these groups of exchanges together, have many miles yet to be constructed, and I believe that now is an opportune time to agitate the question of the standardization of construction.

If you are interested you will no doubt ask what remedy I have to propose and how I propose to apply it: the remedy, like a physician's, will not cure all cases, and in some cases the patient may refuse to take the medicine. In order to get proper action the matter would have to be taken up by the National Association and would require the co-operation of State associations. The only pressure that could be used to bring about this improvement would be educational. Let the National Association appoint a committee to draft copies of construction specifications, covering exchange and toll line construction. Let them adopt materials that are best suited for the different uses to which they are to be applied, according to their strength and dimensions. We will take the item of cross arm braces for an example: The braces should be, we will say, 1¼x¼x26 inches and shall weigh when galvanized 286½ lbs. per 100 pieces. Your galvanizing specifications would familiarize your construction man with simple methods of testing galvanized iron or steel wire and hardware. Construction specifications should be illustrated with examples of the proper methods of pole setting, guying, wire stringing, transposing, etc.

Specifications covering cable work should recommend size of conductors, insulation, resistance, static capacity, thickness of sheath and per cent of tin in sheath for aerial cables. When your specifications and standards have been adopted let the secretary of each State Association be supplied with copies for distribution amongst the operating companies in his state.

This need not prevent the adoption of improved methods; as fast as improvements are made let the standard be raised and the fact made known, so that all may benefit by it. Your competitor does not stop progress by adopting standard materials and specifications; as soon as a good thing is introduced by one of the operating or lessee companies, after examination and approval it is adopted as a standard all over the country. The reason that the small exchange owned and operated by the small company does not usually show up as well by comparison with your competitor's small exchange is that your small company has not had the advantage of your competitor's experience. Independent exchanges in the larger towns and cities, as a rule, are as well or better constructed than Bell exchanges, as they can procure the services of competent engineers to look after their interests.

Standardizing materials and methods does not mean that what is now in service should be taken down and discarded or that there should be any loss incurred by the operating company. It would only be necessary for companies to change their construction to the new style when it has outgrown its usefulness or is worn out, and when erecting additions and extensions.

Abstract from paper read before the Parkersburg Convention of the West Virginia Independent Telephone Association.

RESIDENTS OF KANSAS TOWN OBJECT TO BELL SERVICE.

BELL attempts to undermine the Independent business in Kansas are not proving very successful. At Grantville the Bell Company not long ago took over the local system, which was owned by J. S. Banks.

As soon as the subscribers were made aware of the change an agitation was started looking toward the installation of a new Independent system. Messrs. Pankey and Zimmerman took up the matter, and to-day nine-tenths of the former Independent subscribers have contracted for telephone service with the new system, and a large proportion has ordered the Bell instruments disconnected.

In a vain attempt to hold its ground the Bell Company is offering a rate of $1.25 per month with free service to Topeka and all of Jefferson County, but with very little success. The people are well aware that this is a temporary measure designed to kill out the opposition, after which the rates would be raised to a figure high enough to pay the cost of the fight.

MANUFACTURERS ASSOCIATION OF ILLINOIS PRESENTS TELEPHONE ORDINANCE TO MAYOR DUNNE OF CHICAGO.

MEMBERS of the Illinois Manufacturers' Association state that they are ready to subscribe for $10,000,000 of stock in an Independent company to operate in Chicago. An ordinance drawn up by Levy Mayer, general counsel for this association, has been presented to Mayor Dunne by the secretary, John M. Glenn.

The provisions are in part as follows:

For a twenty-year grant either to the present company or to a new company to be organized.

For a uniform toll system within the present corporate limits of Chicago, and for an extension of this service with the growth of the city during the life of the grant.

For a reduction of from 25 to 40 per cent. in the present charges.

For an increase of at least 25 per cent. in the compensation to the city on the rate paid by the Chicago Telephone Company.

The exact stipulation of service rates is left open pending the receipt of reports of a corps of experts engaged by the association to investigate the character of service and the cost in various cities of the United States and Europe.

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QUERIES

EFFECT ON CONDENSER ON TRANSMISSION.—(677.)

Do condensers weaken the talking circuit on a party line? J. D. J.

The condenser in a common battery sub-station set has no deleterious effect upon transmission in practice or in laboratory experiments. The number of parties on the line does not alter this effect.

If you refer to the practice of cutting a condenser in series with the receiver on magneto party lines so as to allow of ringing when a receiver is off the hook, this does affect transmission to an appreciable extent, but not enough to be objectionable. Each condenser of 2 m. f. capacity is equivalent to about two miles of additional No. 12 copper circuit.

CONNECTING MAGNETO AND COMMON BATTERY SWITCHBOARDS.—(678.)

I am looking up a simple circuit to connect my board which is Sterling magneto to the switchboard of the F. M. Company, which is a Kellogg Central Energy. I have three metallic circuits for trunk lines to their office, and am under the impression that it will give good service if we install a 4-point jack with 500 ohm ringers on their board, and take our trunk lines direct to the jacks without using relays and repeater coils; they could then have a pair of cords equipped with one plug and cord to connect to their system and the other plug and cord to connect on trunk line. Will this work satisfactorily? A. S.

The plan you outline is as shown in Fig 678, which is all right as far as you go, providing you can get the F. M. Co. to put in the circuits you propose. We take it that the Kellogg central energy circuit is like the one we show in the local half of the combination cord circuit, although the Kellogg Company makes a great many circuits for small switchboards. The use of drops instead of the ringers you propose is worth considering, as you thereby give an indication as to what circuit is calling. You can, however, get a ringer of small size with a latch drop indicator which will do the work, but it is more expensive and takes a lot of valuable room. A ringer or drop should be used in the local half of the combination cord circuit for clearing-out purposes. The common battery half of the circuit will operate the same as the remainder of the cords on the switchboard.

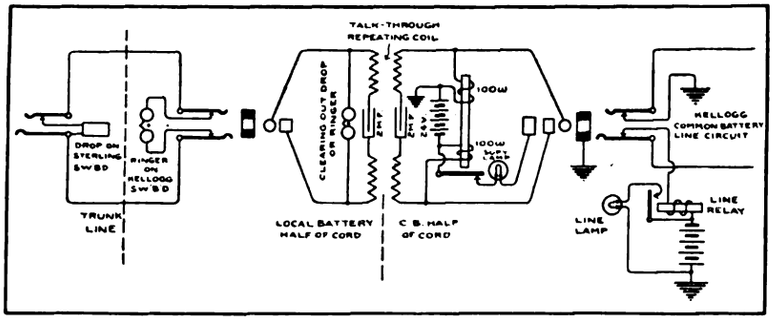

Fig. 678.

INFORMATION OPERATOR.—(679.)

Will you please explain what sort of work is done by an information operator? C. L. F.

An Information Operator has assigned to her the duty of handling all irregular calls in a large exchange which should not be referred to the chief operator. The work is principally concerned with the securing of connection to the proper person when there is any uncertainty with regard to the manner in which he is to be reached. This applies to such cases as the following:

When a person wishes to find a telephone nearest to a given location, the Information Operator, by means of a street list, obtains the required information, and furnishes it to the calling subscriber.

Frequently doubtful calls occur. The switchboard multiple may be marked to indicate that a certain line is a party line, having several subscribers; and, in order to call any one of the parties on the line, it is necessary to know the ring number. If the calling subscriber does not know the ring number he is referred to the Information Operator to have the matter straightened out; the same rule of procedure applies when a call is for a number larger than the highest numbered multiple in the exchange, which would lead the operator to suspect that the party was calling for a subscriber connected to a different and larger office.

Numerous instances of a similar nature arise, in which information is desired for the completion of a connection. All these, to save burdening the subscriber's operator with duties which would reduce her ability to give prompt attention to new calls, are referred to the Information Operator. She is provided with subscribers' lists, lists of changed numbers, disconnections, new connections, etc., which furnish means of securing all information required for the proper carrying on of her work.

The provision of such a special operator is only customary in exchanges where the number of irregular calls is too great to be handled by the Chief Operator. By this means the telephone company handles this class of business rapidly and economically.

GROUNDING COMMON RETURN WIRE.—(680.)

Should the return wire be grounded in a common return system? W. M. T.

The experience of one of the leading engineers who has to do with this type of exchange has been that, as a rule, it is best to ground the common return wire. With a good ground connection on the return it is found that the system is more quiet if some of the lines become crossed with electric light or power wires. In such cases, and with the common return wire grounded, the disturbances would not be passed over the entire system. For instance, when the common return wire comes into contact with the street railway wires, if the common return wire were not grounded at the central, the entire system would be exposed to the current from the street railway circuit. In addition to introducing noisy lines, this would also produce a dangerous condition of circuits, for with the telephone system well insulated in every respect, a cross with the street railway lead would raise the potential of every wire connecting to the telephone exchange to that of the street railway current. A subscriber or employe so unfortunate as to form a connection between the telephone line and the ground would then get a shock from the full voltage of the street railway systems. For these reasons it is advisable to thoroughly ground the common return wire.

PEG COUNT.—(681.)

Please tell me the nature and object of a peg count. C. L. F.

A Peg Count refers to the taking of a count of all calls occurring during a twenty-four hour period in one exchange. It is usually made once a month. The name is probably derived from the custom which formerly prevailed, of moving a plug along in the multiple one jack for each call.

The figures obtained show the number of calls per position per hour, and are used to determine whether the number of operators is too great or too small at each hour of the day, the load even, or if additional swithcboard equipment is required.

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THE EDITOR'S PAGE

STANDARD LINE CONSTRUCTION.

THE members of the West Virginia association at their recent convention heard a paper by Frank B. Hall, which, although brief, served to outline a course for action on a most important subject, and to clearly suggest the necessity for advancement along the lines he points out.

In erecting a telephone plant the first requirement is to provide construction which shall sustain the load to be placed upon it and provide a factor of safety sufficient to bear the unusual stresses imposed during periods of severe weather, such as sleet storms and high winds. While the intensity of the forces produced by such conditions varies throughout different sections of the country, it is nevertheless possible to draw up figures which shall represent the dimensions and strength of material which should be able to withstand the natural forces to which it is likely to be subjected which will hold good throughout a very large section of the country. In special cases, where these dimensions are inadequate, modifications can easily be made.

The second consideration after strength, which insures permanency and freedom from interruption of service, is always economy of construction. In building the vast number of lines which have already been erected and in observing their behavior throughout a considerable period, experience and much valuable information have been gained by many men. If this information could be collected and classified, it would afford data showing the strength, durability, behavior when exposed to the weather and other physical qualities, as well as the suitability of the different dimensions to special purposes, of the various members involved in line construction, which should be sufficient to most effectually determine the very best type. The proposition of standardization would, threfore, not be so difficult as it would be if it involved new experiments in an untried field.

The method in which it would effect economy is evident from the presumption that the use of any excess of material, or improperly designed appliances, or material essentially inferior in nature, or poorly adapted to the use to which it is put, involves not only the liability of inferior service to subscribers, but financial loss to the telephone company. When it is considered that although each individual item of such loss may be small, assuming, for example, that it is only a few cents for a mile of line, nevertheless, if these few cents per mile were multiplied by the number of miles of circuit at present standing in this country, it is obvious that the figures would be enormous.

The advantages coming from the execution of this plan would be felt by the entire Independent organization. They would furnish new companies with a reliable standard, which would enable them to expend their resources with the utmost assurance of obtaining the maximum return on their investments. Interconnecting companies would be upon an equal footing, and the transfer of business from one to another would be upon a much more satisfactory basis. Subscribers to any system would receive the benefit of uniform transmission and security, no matter in what direction from the home office their business should be carried on.

Such action is bound to come at some time, so unavoidable is the conclusion that it is an absolute necessity. As reconstruction is likely to make more rapid progress within the next few years than at any other time, the earlier the standards are established for guidance in this rebuilding the better it will be for the systems of the future. In cases of this kind a saving of time is in the truest sense a saving of money.

ELIMINATION OF WASTE.

THAT the completion of toll calls, in every instance where it is possible, is a duty devolving upon every telephone company as a public service corporation, will not be denied. That the profit to be derived from the performance of this duty in the most complete sense has been shown in practice to be considerable is the conclusion of nearly every company which has made a conscientious and systematic attempt to fulfill this obligation.

Few toll lines of any company are kept constantly busy. As the profit depends upon the number of minutes used by subscribers, under the present system of charging so much for a fixed period of actual conversation, with extra charges based upon additional time, the rate of profit depends absolutely upon the length of time in which the lines are in use by the company's patrons. It is therefore certain that the maximum return on an investment in the line and associated equipment must be secured from a constant use of the wire by subscribers. This condition, which is obviously an unattainable ideal limit, it should be the endeavor of the operating manager to approach as closely as is possible in practice.

The conditions which make it impossible to attain the fullest measure of success in this direction are: First, lack of sufficient business at the originating end to maintain a satisfactory amount of service over the line; which, of course, can only be corrected by the slow methods of securing new subscribers and impressing upon those already connected the merits of the toll service.

The second difficulty, however, is caused by the conditions at the remote or receiving end of the wire; and it has been found that inability to complete a connection on account of troubles occurring in this way is susceptible of correction in a large number of cases.

A number of occurrences, which are all well known and properly classified by operating men, are found to prevent the completion of a call. For instance, the line of the called person may be busy or in trouble, or the person may be out. Such a case presents to a traffic manager alive to the commercial obligations by which he is bound to the management an instance which presents difficulties analogous to an inquiry received by an advertising man. In this latter case, when the inquiry is received, if it does not lead to an order which will produce a profit the advertising manager feels that he has made a failure. In the same way a telephone traffic manager should have in use a method of operating which will insure the completion of nearly every originating call.

The first step in this undertaking falls upon the operator at the terminating end of the connection. In every case where it is impossible to bring the desired person to the telephone immediately the fullest information should be secured. This frequently results in his location at a place where conversation may be carried on from a telephone other than his own. In other instances the time when conversation may be carried on may be definitely determined. The calling subscriber usually finds that this delay is not sufficient to make another method of communication desirable, and the call may be completed at the proper time. The surprisingly large percentage of calls which may be completed through the efforts of a well-trained and courteous operating force make the practise a most profitable one.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

STATUS OF COMPANY AFTER EXPIRATION OF FRANCHISE.

We wish to thank you for the information given us through the Legal Department of your paper, and also wish to avail ourselves of the advantage again. We should like to know the standing of a company holding a franchise in a city of Texas after the franchise has expired. A. T. Co.

THE status of the company depends entirely upon the statutes of the State. The statutes of Texas are not accessible here, so the editor will have to answer according to general principles. These are that if the act of incorporation under which the company is organized gives it the right to use the streets and highways of the State for the purpose of erecting and maintaining a telephone line, the expiration of a franchise from a municipality does not deprive the company of the right to do business therein. Where the State law gives telephone companies organized under it the right to build their lines a franchise from a municipality is a contract without consideration. Macklin v. Home Tel. Co., 24 O. Cir. Ct. R. 446.

If the statutes do not give this right, the franchise from the city is essential, and at its expiration the company is without right in the city.

SUBSEQUENT INCORPORATION OF A TOWN DOES NOT EFFECT FRANCHISE.

Will you tell us the position of a company when it has been operating in an unincorporated town under a permit from the county commissioners, in the event the town incorporates? H. G.

THE position of a telephone company under the circumstance you mention is no different after the incorporation of the town from what it was before. The permit from the county commissioners will be the authority of the company for operating in the town after it is incorporated. It has been held that a franchise granted by a county must be recognized by a town subsequently incorporated within the county. 38 Vt. 193, 100 U. S. 514.

SUIT TO RESTRAIN CONNECTIONS.

THE Green Bluff Telephone Company of Spokane, Wash., has instituted an action against G. M. Nunn, in which it prays for an injunction restraining him from using its lines. It is alleged that the Green Bluff Telephone Company operates two lines between Green Bluff and Mead, and that the defendant, past whose property the lines of the company run, although not a member of the company and without any authority whatever, attached a telephone wire from his residence to one of the wires of the company, installed a telephone in his home, and began at once to use the lines of the company against its will.

A FRANCHISE AN INCORPOREAL HEREDITAMENT.

IN actions to recover taxes paid by the Stockton Gas & Electric Company to the tax collector of San Joaquin County, California, under protest, the court laid down an important principle of law. The taxes were assessed upon a franchise to use the public streets of the city of Stockton for electrical purposes. In addition to the assessment upon its franchise, the company was also assessed each year upon other property in the city, including its pipes, poles and wires. No question was raised that a franchise was property under the terms of the constitution and revenue laws of the state, and that it was taxable as such. The sole question was whether the franchise assessed against the plaintiff was properly assessable in the county of San Joaquin. The company contended that its corporate franchise was assessable only in the city and county of San Francisco, where its principal place of business, fixed by its articles of incorporation, was. The constitution provided that "all property . . . shall be assessed in the county, the city, city and county, town, township, or district in which it is situated." The court held that the franchise extended by the constitutional provision to lay pipes and conduits, or erect poles and supply the inhabitants of a city with artificial light, is an incorporeal hereditament, is real estate in the nature of an easement, pertaining to the streets of the city in which it is exercisable; that it is inseparably annexed to the soil out of which the profit arises, and has a local situation in the place and that place only, where the right is actually exercised. The court therefore held that the franchise was assessable in the city of Stockton and county of San Joaquin and denied the right of the company to recover the amount of the taxes paid under protest. Stockton Gas and Electric Co. v. San Joaquin Co., 83 P. 54.

TEXARKANA ATTEMPTING TO DRIVE OUT BELL TELEPHONE COMPANY.

THE city of Texarkana, Tex., has commenced suit in the District Court asking for an injunction to restrain the Southwestern Telephone Company from carrying on business inside the city limits. Several months ago it was ascertained that the telephone company had no franchise to do business on the Texas side, although it had been operating there for more than twenty years. It was asked by the city council to take a franchise and give the city 5 per cent. of its gross earnings, but refused. The city then granted the Texarkana Telephone Company (Independent) an exclusive franchise for local business for a consideration of $100 per month. The company paid the first $100, and immediately the city proceeded to drive the Southwestern Company out of the territory.

KENTUCKY'S RETROACTIVE FRANCHISE LAW.

THE East Tennessee Telephone & Telegraph Company has sued for an injunction against the city of Paducah in the Federal Court at Louisville, seeking to enjoin the city from circumscribing the rights and privileges and from interfering in any way with the operation of the company in the city of Paducah.

The East Tennessee Telephone Company claims that it operates under a legislative grant which is perpetual, and which cannot be abridged or modified by a municipal board. The grant was secured before Kentucky had franchises, and when the new constitution was adopted and franchises came into existence it was claimed that the law could not be made retroactive, or, in other words, could not force any person or company that already had a right to do business, to buy a franchise in order to do business thereafter. The city about two years ago, after allowing the company to operate a dozen or more years without a franchise, decided that it was necessary for it to get one, but the company refused. Once a suit was brought to "oust" it, but it was compromised by the company paying the city $3,000. Later and recently another disagreement arose between the company and city.

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IN THE OPERATING FIELD

INDEPENDENT COMPANY IN NEW MEXICO PROSPERS.

STARTING about a year ago with only eleven subscribers, the Johnson-Mesa Telephone Company, operating in Raton and Folsom, New Mexico, has now nearly one hundred subscribers and is adding new ones daily. At a recent meeting of the company it was decided to erect a metallic toll line between the two towns, and to install an exchange at Folsom to take care of the growing business of the company. Upwards of $800 will be spent during the coming summer to improve the system, which will then have over 200 miles of lines.

The subscribers are all stockholders and the plant is free from debt.

NEW INDEPENDENT EXCHANGE IN SERVICE AT PARK CITY, UTAH.

BUSINESS men in and around Park City, Utah, are all favorably commenting upon the excellent service which is being given by the Utah Independent Telephone Company. The local exchange was opened a little over a month ago and during the interval the construction force has been kept busy installing new sub-station apparatus. The company erected a modern fire proof exchange building and installed a common battery switchboard of the latest type at an expense of $50,000.

Included in the equipment is a toll board having an ultimate capacity of one hundred and forty lines. The toll and long distance lines already built and now under construction will connect this point with numerous towns in Utah and adjoining states. Connection has already been established with Preston, Idaho, on the north and notwithstanding the difficulties of construction encountered, the service is excellent.

INDEPENDENT EXCHANGE AT MONROVIA, CAL., WILL RECEIVE IMPORTANT ADDITIONS.

IMPROVEMENTS in its switchboard plant and extensive cable installations, which will cost about $10,000, are planned by the Home Telephone Company, of Monrovia.

Growth in the number of subscribers during the past year has been rapid. Three long-distance lines are constantly in use and another one to Los Angeles will soon be connected. There will also be a new branch exchange at Sierra Madre to relieve congestion at the Monrovia main exchange.

Another story will be built on the one-story brick building which now houses both the offices and exchange. In the second story the new central energy switchboard will be placed. The first floor will be occupied by the office forces. For lines on the principal streets 12,000 feet of cable will be put in use. The passing of the control of the stock into the hands of Dr. West Hughes, of Los Angeles, marked extensive placing of capital. Local directors of the company are J. M. Baldwin, who is also manager; F. N. Hawes and Frank J. Cornes.

AMERICAN COMPANY LEAVES NASHVILLE.

THE American Telephone and Telegraph Company, which is and has been for a number of years operating in Nashville, Tenn., without a franchise from the city, has been notified by Mayor T. O. Morris that unless the company secured a franchise it would be compelled to quit doing business in Nashville and, as anticipated, the company will transfer its property in Nashville to the Cumberland Telephone and Telegraph Company. The city attorney held that the company might be compelled to submit to any requirements the city might see fit to impose on it or might be entirely excluded from doing business in the city. The mayor addressed the following letter to James E. Caldwell, president of the Cumberland Telephone and Telegraph Company:

"I hereby notify you that the wires of this company must be removed from your poles unless the proper steps be taken to secure the authority for this company to do business in this city."

As a result the Cumberland Company agreed to buy the property of the American Company in the city at the cost price and also to connect the wires of the former company with those of the latter at some point or points outside of the city. It is probable Franklin and Gallatin will be selected.

To the mayor the representatives of the American Company stated its business was so small as not to warrant application by it for a franchise. Heretofore it was supposed the company had a right to operate in Nashville under the law of 1885 and was so advised by its attorneys, but they admitted this supposition was erroneous, and the company was willing to withdraw entirely from Nashville. The mayor was asked if he objected to the sale of the company's property to the Cumberland Company, to which he replied that he would interpose no objection to the sale.

CITY OF LOUISVILLE AIMS DIRECT BLOW AT EXCESSIVE BELL RATES.

AN ordinance which has for its object the regulation of telephone rates in Louisville, Ky., is up for consideration before the governing bodies of that city. In its present form the ordinance forbids the charging of a rate in excess of $4 per month for business telephones. An amendment provides for fines of from $10 to $100 for every failure on the part of the telephone companies to comply with the ordinance.

It is especially directed against the Cumberland (Bell) Company, which is said to have been charging exorbitant rates. If the ordinance becomes a law this company will stand to lose from $100,000 to $1,000,000, as it claims to have 10,000 telephones in service.

It is likely that the terms of the ordinance will be made very rigid on account of the declaration of defiance made by the Cumberland company, which has announced its intention not to comply with it, in case of its passage, on the ground that it is unconstitutional. The councilmen believe that they have the power of regulation in this case, and the members of the Revision Committee are determined to force the question to an issue.

The ordinance has already been passed by the Council, and now awaits the action of the Aldermen.

BELL FAILS TO STAMPEDE IOWA FARMERS.

FARMERS residing in the neighborhood of Boone, Ia., were recently approached with a proposition by the Bell company to the effect that if they would sever their connection with the Boone County Independent system and connect with the Bell they would be given service at half the rates they were then paying. A meeting was called to discuss the situation and after both sides had been heard the farmers unanimously decided to stay with the Independent system, with which they renewed their contracts at the old rate.

MILWAUKEE COUNCIL PREPARED TO PASS ORDINANCE GRANTING FRANCHISE TO INDEPENDENT COMPANY.

ALL indications point to an early grant of an Independent franchise in Milwaukee, Wis. The West Shore Telephone and Telegraph Company has been before the city with an application for a franchise. With a few amendments the proposition it has offered is satisfactory and will be further considered by the common council.

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—6-100 pair and 11-50 pair Sterling Inside Terminal Heads complete with heat coils. Used very little and good as new. Address, Macon County Telephone Co., Decatur, Ill. 580

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—1,800 line, multiple, lamp signal, Central energy switchboard of latest Stromberg-Carlson make. Just from the factory. Not yet unpacked. Terms to suit. Also modern telephone exchange and electric light plant in progressive South Carolina town of over 2,000 inhabitants, $14,000; $3,000 cash; balance on easy terms. Piedmont Electric Co., Anderson, S. C. 563

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WANTED—Position wanted by telephone man. Can hold any position. Best of references. Address Box 584, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 584

WANTED—Ten first class cable splicers familiar with underground and aerial work. Must furnish references with application. Also two able cable foremen to supervise work of splicing gangs. Must be well recommended. Address, Box 586, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 586

WANTED—By a large telephone factory in Chicago, young men not over 22 years of age, preferably graduates of high schools or technical schools, to enter an apprenticeship course and be trained to install and operate modern central office equipment. Address, stating age, education and experience, Box 582, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 582

WANTED—Wire chief on exchange of 700 to 1,500 magneto subscribers in Kansas. One who is also good on outside construction. Must be able to handle storage batteries, rural and toll lines. If interested, write stating salary, etc., to Box 583, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 583

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WANTED—Telephone men experienced in automatic switch work. State experience and salary expected. Address Supt. of Equipment, Home Telephone & Telegraph Co., Los Angeles, Cal. 581

WANTED—State representative wanted by telephone manufacturer for Pennsylvania and Ohio. One familiar with common and local battery apparatus. Address Box 578, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 578

WANTED—Cable splicer. Young man thoroughly competent to splice lead cables, underground and aerial. Work must be first class. Permanent position to right man. Address York Telephone Company, York, Pa. 576

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A purchasing clause has been inserted in the documents which gives the city the right to buy the plant at any time during the life of the license. While the city now pays the Wisconsin Telephone Company a large sum for telephone service, the new company will be required to give free telephones to a majority of the city offices. It is also required to connect with Independent long distance lines reaching the city and not to charge any more than is charged in any city of 200,000 population and upwards for such connections. The franchise will be void in sixty days if the company refuses to so connect with an Independent long distance line.

The company must put up a bond of $25,000 to protect the city from damages and must begin work six months after accepting the franchise and within six months after the beginning of work it must spend $100,000 on the plant. A bond of $25,000 to insure this must be filed. It will be returned when the conditions have been fulfilled.

All wires within three miles of the city hall are to be underground. In twelve years all the wires of the company are to be put underground if the city so orders, and if all other wire using companies are required to do likewise.

It is required that if a company operating a telephone exchange in Milwaukee buys out this company, the conditions of this franchise shall apply to all lines of the purchasing company.

The franchise of the West Shore Telephone and Telegraph Company was selected from among the five before the committee because it appeared to the aldermen that there was the least question about this being an Independent company.

It is said that the ordinance is to be amended so that eight hours shall be the working day of the company's employees and so that union labor shall be employed in all branches where the craft is organized in Milwaukee. This is to be done at the suggestion of F. L. Witters, business agent of the Electrical Workers, and J. J. Handley, of the Federated Trades Council.

The West Shore Company will adopt the flat rate method of charging for service. The provisions of the ordinance regarding the price of service are as follows:

When five thousand (5,000) shall be in operation, the rental for full metallis long distance telephones shall be as follows:

BUSINESS RATES.

	Per Month.
Individual line, service unlimited	$5.00
Auxiliary telephone, portable or permanent desk set in connection with main instrument	1.00
Two parties on one line, unlimited calls	3.50
Three or four parties on one line, unlimited calls	3.00
And the residence rates shall be as follows:	
Individual line, unlimited service	$3.00
Auxiliary telephone, either permanent or portable desk set in connection with main instrument	1.00
Two parties on the line, unlimited service	2.50
Three or four parties on one line, unlimited service	2.00

Until fifteen thousand (15,000) telephones, within the city of Milwaukee, are in operation and connected up with bona fide subscribers the rental per month shall be as above specified, but for each additional 1,000 connected up after the 15,000 are in operation and use, the said grantee may, at its option, increase the rental for telephone service for full metallic long distance business and residence telephones $1.50 per year for each additional 1,000 installed, on all the telephones then used by bona fide subscribers, to said telephone company and exchange.

NORTHERN NEW YORK SOON TO HAVE ANOTHER FIRST CLASS INDEPENDENT EXCHANGE BUILDING.

THE Niagara County Home Telephone Company has started the construction of a new common battery exchange, to take in the twin cities of North Tonowanda and Tonawanda, New York.

The building which is in process of erection will be practically the same as the one at present occupied by the company in Niagara Falls, which was built last summer. This building was designed by General Manager R. M. Eaton, who has produced what is conceded to be one of the best designed buildings for all-around telephone purposes in the country.

The company has ordered for its Twin City exchange equipment which is of the same type as that in use at Niagara Falls. The telephones to be used will be all of stamped steel, no wood instruments of any kind becoming a part of the plant.

It is proposed to have the work so far advanced that the old systems may be cut over to the new on the 1st of July. The company will then be in a position to furnish service conforming completely to the high standards which have so rapidly won the approval of the public in the territory which it covers.

INDEPENDENTS BUILDING LINES IN TENNESSEE AND PREPARING TO ENTER NASHVILLE.

THE Home Telegraph Company of Nashville, which has put up poles and wires on several streets in the city running from the northern to the southern limits, has also put up its poles and wires from Spring Hill, twenty miles outside the city, south to Decatur, Ala., and is now erecting poles from Spring Hill toward Nashville. Poles are also being erected in a northwesterly direction, the intention being to run a line from Nashville to Springfield, Robertson county, some 30 miles distant. The city of Nashville has been temporarily enjoined from interfering with the erection of poles and stringing of wires within its limits.

The Home Telegraph Company is owned and operated by the same parties as the Home Telephone Company, which was refused a franchise by the City Council some months since, and it is generally believed that the telegraph company is erecting the poles and stringing the wires to prepare for the operation of a telephone system. The Home Telephone Company is hard at work in Macon county erecting poles and stringing wires, and many contracts to take this company's service have been made with the people of that county.

ALEXANDER GRAHAM BELL PREDICTS WIRELESS TRANSMISSION OF SPEECH.

BRANTFORD, ONTARIO, has recently held a celebration which was attended by Alexander Graham Bell. The famous inventor in an address delivered during the proceedings stated that the idea which led to the development of the telephone first came to him in Brantford, and it was there that he first succeeded in transmitting speech over a considerable distance.

In a newspaper interview given a few days ago he is reported to have said in response to an inquiry: "I firmly believe the time will come when wires will not be necessary in telephoning. We already have wireless telegraphy. Why not wireless telephony?"

INDIANA MAYOR WILL VETO ORDINANCE ALLOWING COMPANY TO CONNECT WITH BELL LINES.

THAT Mayor Brouse of Kokomo has little or no confidence in the purposes of the Citizens' Telephone Company is shown by the fact that he has vetoed the ordinance just passed by the council granting the Citizens' Telephone Company the right to form connections with the Bell Telephone Company for long-distance service to points not reached by the New Long Distance Telephone Company's lines.

Mayor Brouse contends that the action of the council would be likely to deprive the subscribers of the Citizens' Telephone Company of the advantages that comes of having competition for long-distance service. The ordinance granting the local company the right to connect with the Bell company for non-competing points was passed by unanimous vote of the council, but seven of the twelve have said they would not vote to pass it over the Mayor's veto. Hence the probabilities are that the Independents will remain in possession of the field.

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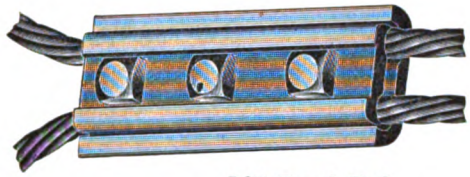

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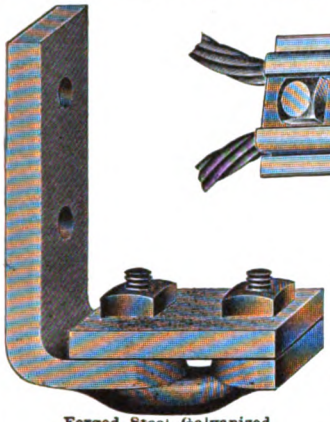

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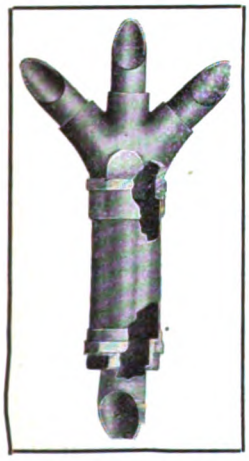

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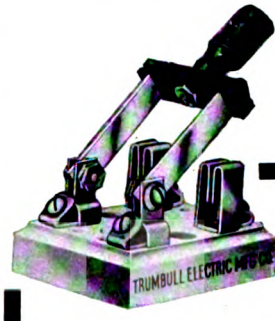

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is particularly adapted for this use. When closed it makes a positive connection between the line and instrument, and on account of the even tension between the blades and the contact clips there is no possibility of dirty contacts causing noise. No matter how many times it is opened or closed, it will never fail to work successfully.

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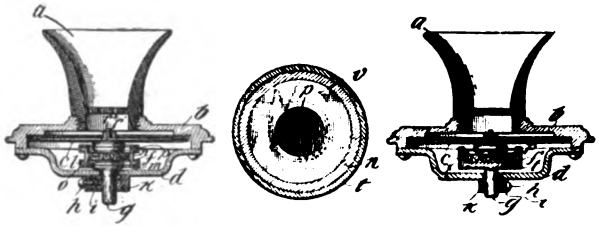
TELEPHONE PATENTS

TELEPHONE TRANSMITTER.

Ernest E. Yaxley, Chicago, Ill., patents (No. 815,889; dated March 20, 1906; filed September 26, 1905; serial No. 280,158) and assigns to the Monarch Telephone Manufacturing Company, Chicago, Ill., a transmitter.

The object of this invention is to provide means whereby the entire granular material contained within the electrode chamber can be subjected to agitation. Referring to the illustrations, the novelty of construction lies in the use of two mica rings *v*, *w*. The chamber *n* is provided with an annular inset or shoulder *u*,



upon which these rings are seated. Each is provided with an entire granular material contained within the electrode chamber chanical contact between the electrodes and the rings is maintained solely by pressure, and is regulated to prevent the carbon particles passing between them to the exterior portion of the containing chamber, by means of the sliding stem *g*. This can be moved in or out and when the correct adjustment is secured it is locked in position by means of the set screw *h*.

By this construction it will be seen that the granular material lies substantially between the planes of the inner surfaces of the electrodes and beyond their faces. Owing to the flexibility of the containing rings vibrations of the main diaphragm will be communicated to every part of the chamber and consequently all the granular material will be agitated.

PARTY-LINE SYSTEM.

Edward A. Buell, De Kalb, Ill., patents (No. 811,692; dated Feb. 6, 1906; filed May 1, 1905; serial No. 258,276) a party-line telephone system.

In this patent the inventor utilizes the ringer movement to actuate step by step mechanism to connect the telephones to the circuit. An auxiliary electro-magnet is employed which returns the ringer magnet mechanism to its normal position after it has accomplished its desired functions. Means are also provided by which the operator at the exchange can eliminate the selective features of the apparatus at all the substations so that any party can call any other without the aid of the operator.

TELEPHONE APPARATUS.

John G. Roberts, Detroit, Mich., patents (No. 815,380; dated March 20, 1906; filed June 26; renewed September 19, 1902; serial No. 124,083) and assigns to the Kellogg Switchboard and Supply Company, Chicago, Ill., a telephone ringing and signaling system.

The principles involved in this invention relate to automatic ringing and signaling. Means are disclosed for the automatic connection of ringing current at specified intervals of time to the calling cord circuit after it is connected to a line; for the automatic disconnection of the ringing mechanism after a prescribed number of rings, if the subscriber does not answer; for the automatic connection of a "don't answer" signal to the answering cord circuit; for the automatic display of a visual signal at the exchange when the called party fails to answer after a given time; for the automatic disconnection of the ringing mechanism from the circuit when the subscriber answers, and for a locking arrangement by means of which the ringing current is prevented from being switched into connection with the line after the party hangs up his receiver and which cannot be unlocked until the plug is removed from the jack.

Owing to the complicated nature of this patent it will be impossible to give a clear description of the means employed and we therefore suggest that parties interested procure a copy.

TELEPHONE CALL.

Peter Thomas Geyerman, Brewster, Minn., patents (No. 811,052; dated Jan. 30, 1906; filed Mar. 14, 1905; serial No. 250,032) a telephone call.

The object of this invention is to secure secrecy on telephone lines carrying a plurality of stations and it also discloses means whereby selective signaling can be attained.

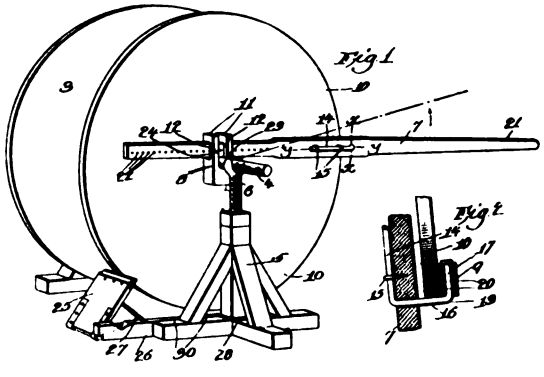
To accomplish these results the subscriber is called upon to perform five different operations. The claims granted are mainly for mechanical arrangements of the parts and do not include any basic statements.

CABLE REEL WINDER AND BRAKE.

George W. Brown, Hyde Park, Mass., patents (No. 815,261; dated March 13, 1906; filed August 16, 1905; serial No. 274,474) a cable reel winder and brake.

The essential feature of this invention consists of the use of a lever to rotate the reel for either winding up or unwinding cable from it.

Referring to the illustration 3 is a reel supported on an arbor 4 mounted on a lifting jack 5; 7 is the lever mounted at one end by a fulcrum block 8 carried by the arbor 4. Attached to lever 7 by means of the U shaped arm 13 is a gripping block 9. This block is pivotally attached to arm 13 and is provided with projections 20, adapted to engage the face of the flange 10 of the



reel 3. A brake 25 is provided to prevent the backward movement of the reel and is controlled by spring 27.

In operation the fulcrum block is slipped on the arbor 4, the lever 7 passed through the slots 12 and adjusted in position which is maintained by the insertion of a pin 24 passing through one of the arms of the fulcrum block and one of the adjusting holes 22 of the lever 7. The lever is then lifted up and as pressure is applied in its descent the gripping block 9 is pressed into contact with face of flange 19 causing the reel to revolve.

Moving the lever upwards disengages the gripping block and the backward movement of the reel is prevented by the brake 25.

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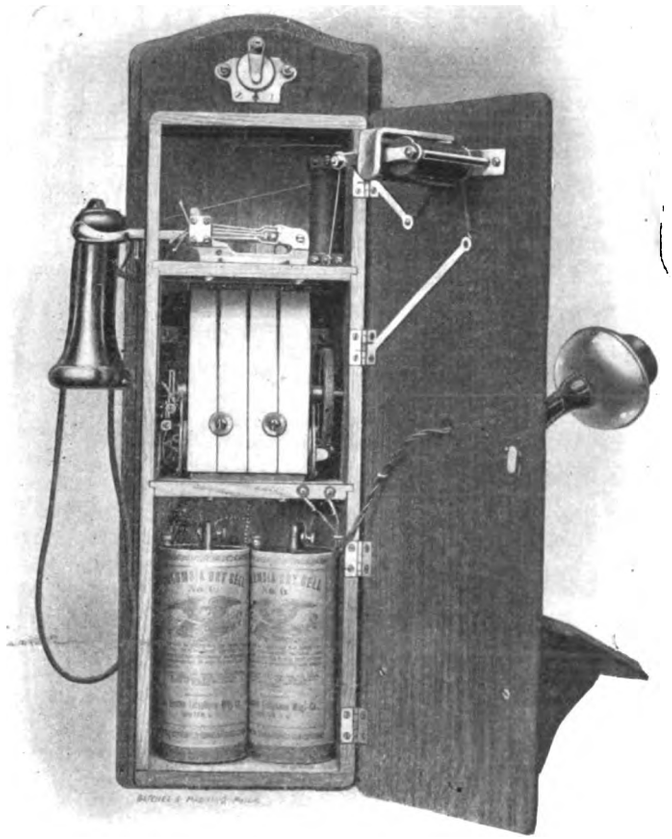

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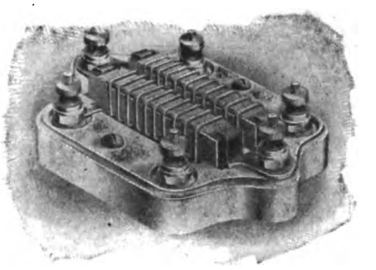

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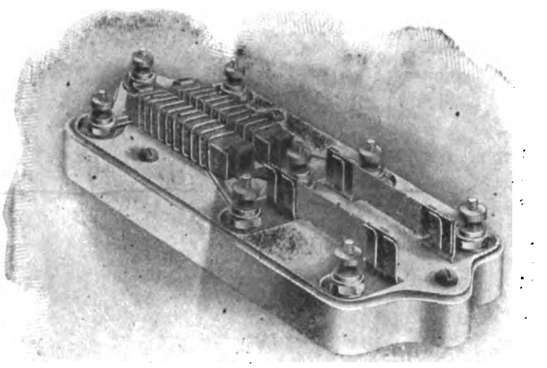
- Toll Line Apparatus
- Common Battery Apparatus



No. 2001

Sandwich Polo Changer Company

400 Eddy St., Sandwich, Ills.

Do You Get Our Rings? If not write for Prices and Catalogues of our

Pole Changers
Ohmmeters
and
Duplexers

Guaranteed to you.

DUPLEXERS

That Will DUPLEX THE ILLINOIS AND SANDWICH DUPLEXERS

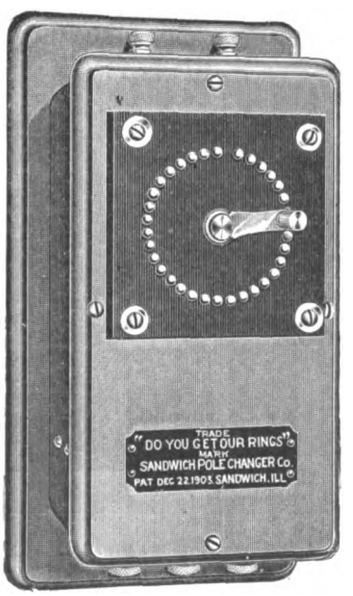
Let us make

3 Metallic Circuits Out of 2 Circuits

for you. You can divide your Metallic Circuits. You can give an Independent Circuit to one or more subscribers.

You Can

Increase Your Toll Lines 100 per cent.



THAT DUPLEX

These Duplexers are provided with a very simple but efficient

Balancing Device

A child can balance your lines instantly with this switch after your Duplexers are once installed.

You need not buy before being convinced of their true value We send our instruments on 30 DAYS' FREE TRIAL So you may know how much TIME and money they will SAVE you. Write and let us know your needs. We can do you a great amount of good for a small outlay of money.

SANDWICH POLE CHANGER COMPANY, 400 Eddy St., Sandwich, Ills.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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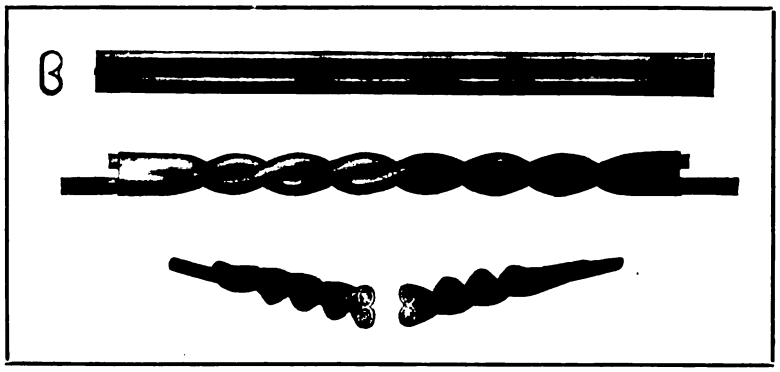
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A TUBULAR FUSE.

EXTREME reliability is claimed for the Fi-ne tubular fuse manufactured by the Fisk-Newhall Telephone Manufacturing Company, Chicago, Ill., of which we present an illustration. The enclosing of the fuse wire within a glass tube protects it from drafts, which are liable to vary the rate at which the wire is heated, and insures that all fuses of a similar rating shall operate on the same current. Moreover, as the amount of air which must be heated in connection with the fuse wire is definite, the time at which the rupture occurs may be very accurately predetermined.

The company claims that the fuse is certain to rupture within three to five seconds of the time that it receives the load for which it is marked. They are furnished in the usual ratings for circuits using small amounts of current. Further information, prices, etc., can be obtained by writing to the manufacturers.



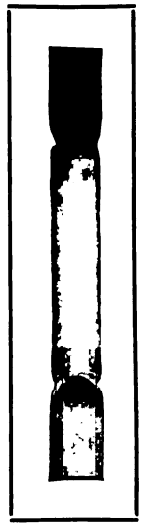
New Wire Connector Made by Frank B. Cook. Note that wire is in contact with sleeve throughout its entire circumference.

A NOVEL BATTERY CARBON.

UPON this page is shown an illustration of a carbon pencil which enters into the construction of the No. 6 Fleur de Lis dry cell, manufactured by the French Battery Company, 69-75 Wells Street, Chicago, Ill.

It will be observed that the form of this pencil is such as to give the greatest possible extent of surface for a given volume of carbon. This enables the company to use in a cell of a given size the maximum amount of active material, which contributes, as the company claims, to give the cell remarkable qualities of efficiency and endurance.

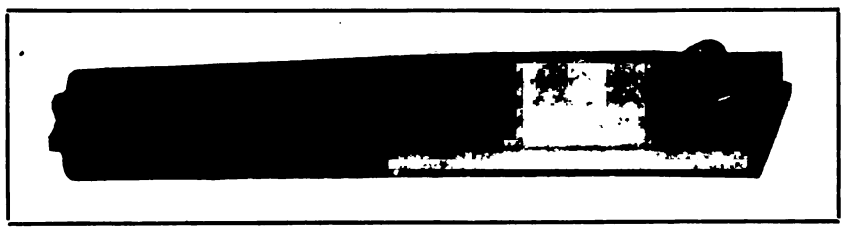
The carbon is imported, and the company states that it is of a very superior quality. All the other materials are claimed to be of the same high grade as the carbons, securing a combination which, from the satisfactory electrical results obtained, and from its economy, makes it extremely desirable. The company will be pleased to furnish detailed information concerning its product to those who forward them inquiries.



Fi-Ne Fuse.

A NEW WIRE JOINT.

FRANK B. COOK, 246 West Lake street, Chicago, Ill., has put upon the market a self-welding wire joint for which he claims important advantages. The illustrations shown upon this page give an idea of the form of this connector. It is so designed that the mere act of twisting draws the sleeve into the recess between the wires, and stretches it in such a way that it is absolutely tight around the entire circumference of both wires. It will be seen that such a device makes a much firmer joint, with better electrical properties than one in which the contact between the sleeve and the wires is obtained only upon two opposite sides of each wire, leaving a large portion of the circumference free from contact with the sleeve. Further details, prices, etc., will be furnished upon application to the manufacturers.



The Special Fluted Carbon Used in the Batteries Made by the French Battery Company.

IMPORTANT PATENT SUIT DECIDED.

THE patent suits over various telephone protective devices, which have been pending for the past three years, have finally come to a termination. Judge Anderson, of the United States Circuit Court for the District of Indiana, has handed down his decision, which gives the Sterling Electric Company of La Fayette, Ind., the exclusive right, title and ownership to all of the patents at issue.

Mr. Cook was one of the incorporators of the Sterling Electric Company, and at the time of the removal of the company to La Fayette was its president. He had assigned to the Sterling Electric Company the right and title in all of his patents and inventions. Mr. Cook retired from the company in February, 1902, disposing of all of his stock. After making the transfer he instituted suits in the United States Circuit Court against the Sterling Electric Company, claiming that it had no right to his patents and inventions and also for a measure of damage. The bill of complaint was not answered by the Sterling Electric Company, but it filed a plea claiming complete ownership of these patents and asking the court to approve and adjudge such ownership.

The cases have been bitterly fought for over three years, Cook being represented by Stuart, Hammond & Sims, of La Fayette, and C. C. Buckley, of Chicago; the Sterling Electric Company by John F. McHugh, of La Fayette, and C. A. Brown, of Chicago.

Mr. Walter E. Doolittle, president of the Sterling Electric Company, stated that the policy of the company in this matter will be an aggressive one. It has suffered untold injury by way of prestige and loss of business and it is its intention to recover every dollar of loss and prestige, and an additional amount for the damage which has been done its business. He says it is in a position to ask for and be granted an injunction, not only against Cook, but against other manufacturers, receive an accounting for the goods they have manufactured and figure a measure of damage.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., wishes to call attention to its bridging instrument, Hercules type, with a condenser installed in the secondary circuit, as shown in the accompanying illustration.

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Avenarius Carbolineum is a Wood Preservative

which has been on the market for the past 30 years. It is the only preparation known which absolutely protects and prolongs the life of wood exposed to the elements.

It can be applied with a brush, and owing to its high specific gravity readily penetrates to the heart of the wood, expelling moisture and killing all germ and insect organisms.

It gives a durable nut brown stain, and thus serves the purpose of paint at less expense.

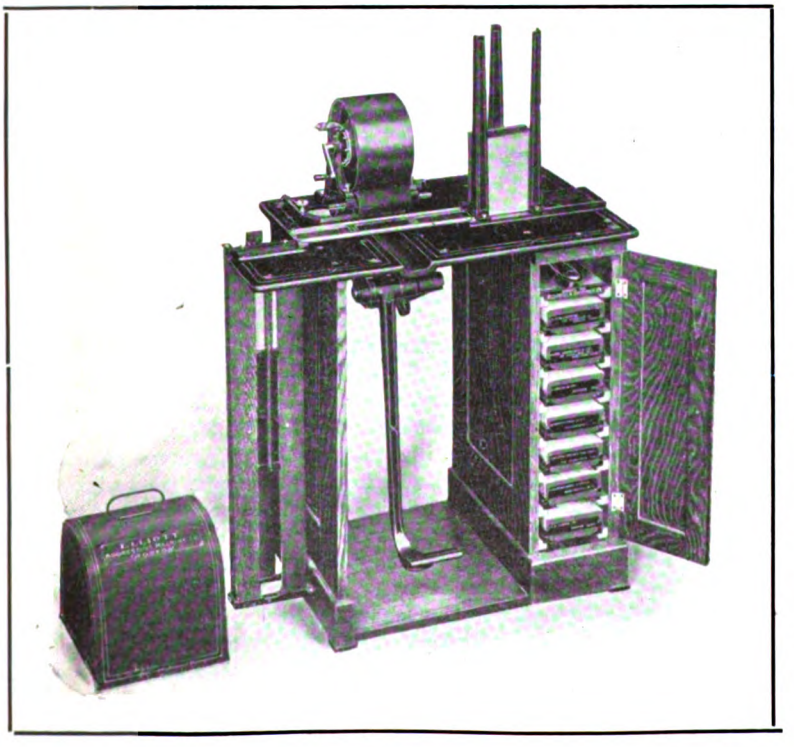
POLES, CROSS ARMS, PINS, GAINS, POLE ROOFS, ETC., ARE ABSOLUTELY IMMUNE FROM THE ACTION OF THE ELEMENTS OR INSECT LIFE IF TREATED WITH AVENARIUS CARBOLINEUM.

We have hundreds of testimonials to prove our statements besides the specifications of government engineers and analytical reports from chemists of world wide reputation.

Let us send you copies. Also write for our explanatory booklets.

CARBOLINEUM WOOD PRESERVING CO., 126 Reed Street, MILWAUKEE, WIS.

CLASSIFICATION BY COLOR
in the ELLIOTT ADDRESSING MACHINE



shows the Form of Bill to be addressed from each stencil, by Perfect Visibility Before, In and Beyond Printing Position. With the

Hand Stencil Feed

the Number of Impressions from each stencil may be Regulated at Will.

THE DUPLICATOR

may be set for a Single, Double or Consecutive Imprint, and works automatically. Ask us about it.

Elliott Addressing Machine Company

101 Purchase St., Boston, Mass.

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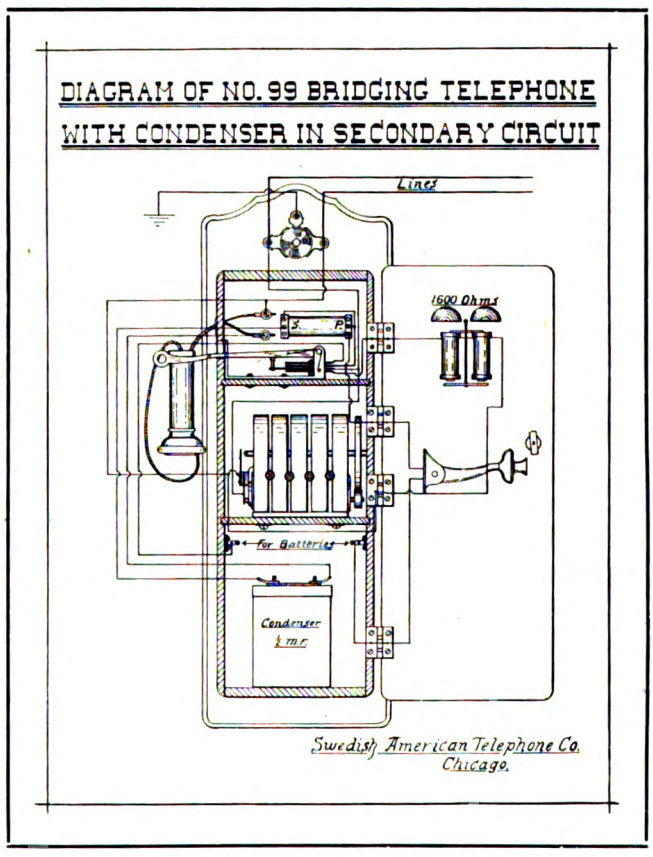
IN THE MANUFACTURING FIELD

All subscribers on heavily loaded rural or party lines have experienced more or less trouble in signalling their central station by reason of curiously inclined subscribers removing receivers from the hook when the bells ring, making it almost impossible to ring a second signal.

This trouble can be effectively and cheaply remedied by using a condenser in the secondary circuit. This can be easily installed in bridging instruments now in service at a nominal cost. The ½-micro farad capacity condenser is the type almost exclusively used and recommended by this company for bridging instruments.

The Swedish-American Company wires all of its bridging instruments for a condenser, whether so equipped or not, in order that, if at any future time they may be required, it will be possible to easily and quickly place them in the instrument. The Swedish-American Company manufactures its condensers of the best grade of rice paper and tin foil. They are so constructed that each layer of paper and foil is in perfectly even layers, preventing any possibility of creased or cracked foil, which would sooner or later result in the burning out of the condenser. Those contemplating the installation of bridging instruments may obtain information from the company.



The Wesco Supply Company, St. Louis, Mo., has recently distributed to the trade its new switchboard bulletin No. 68, which shows a very complete line of magneto switchboards, ringer boards, switching devices, etc. This bulletin is very complete in its description of the various parts and advantageous features of the apparatus shown, and should be of much interest and benefit to those who receive it.

Although this bulletin has been distributed within the past 30 days, the Wesco Supply Company reports numerous inquiries and has already effected the sale of 15 of its new type switchboards, ranging from 50 to 300 lines capacity.

Distinction of Character is the title of an ingeniously designed folder issued by the Swedish-American Telephone Company of Chicago, Ill. Those who wish to learn what are the two important kinds of individuality, and how the Swedish-American Company has observed the better kind in such a way as to result in the improvement of its apparatus, should send for this folder.

The Manufacturers' Advertising Bureau, which has been located on Liberty Street for many years, has removed to 237 Broadway, New York City, in order to secure the greater space required for its increasing business.

The bureau has been established since 1877 and has made a speciality of electrical advertising for many years, and is considered an authority on that subject. The bureau intends to somewhat broaden the scope of its work, and while particular attention will be paid to advertising in the trade and technical journals, as heretofore, it will be equipped to handle advertising in the newspapers, magazines and all other periodicals as well.

Circuit diagrams and illustrations from working drawings and photographs of cabinets are combined in a new bulletin in such a manner as to give very complete and useful information concerning the telephones put upon the market by the Dean Electric Company of Elyria, O. The variety of instruments described includes types suitable for every class of work, and sufficient information is given to enable the reader to determine for himself the merits, and adaptability to his purpose of the high grade instruments furnished by the company. As general conditions dealing with matters which will be brought up in the selection of instruments are discussed in an interesting manner, the bulletin deserves to take equal rank as a source of general information with the other well designed booklets which are issued by this company in a standard form. This bulletin, which may be bound with the others which have been issued, or will come out in the future, may be obtained by writing to the company for bulletin No. 101.

The Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., reports having just closed a contract with the Kinloch Long Distance Telephone Company of St. Louis, Mo., for 10,000 central energy telephones. This is the first order the Kinloch Company placed for new telephones to be used in conjunction with the 17,000 line switchboard now being installed by the Stromberg-Carlson Company.

The Baird Manufacturing Company, 6 Michigan street, Cihcago, announces that the Chipley Telephone Company, of Chipley, Florida, is equipping its rural lines with the Baird Secret Service system. There are now quite a number of telephone companies in the State of Florida using Baird lockouts. This system is also being installed by the Beaver Telephone Company, of Rochester, Pa., which will operate it on a large number of rural lines radiating from that point.

The John A. Roebling's Sons Company, Trenton, N. J., has just issued an illustrated booklet describing the process of splicing wire rope. The illustrations are exceptionally clear and practical, as they are made from photographs taken during the progress of an actual splicing operation. Sixteen separate full page views are given and facing each is a page of descriptive matter which directly relates to that particular part of the work. Great care has been exercised in the compilation of the test to make every detail clear so that an ordinary mechanic can by a small amount of practice turn out a satisfactory splice. The latter part of the volume is devoted to descriptions of the different types of wire ropes manufactured by the company. Parties interested can secure this booklet without cost by applying to the company.

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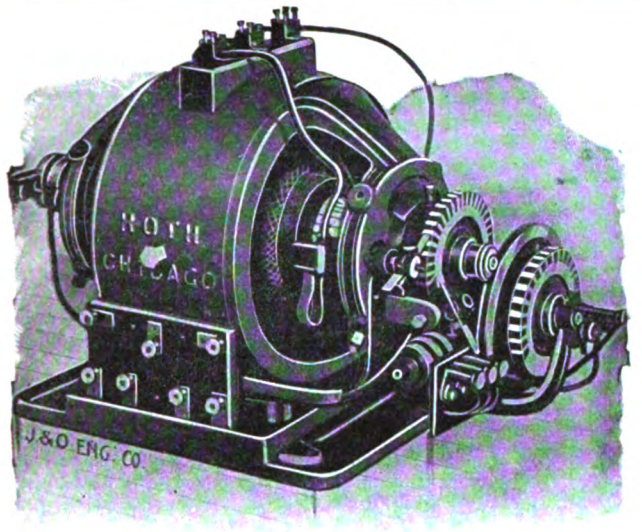


WE ARE SPECIALISTS IN THE DESIGNING AND MANUFACTURING OF POWER APPARATUS

for telephone work. The result of years of experimenting in this particular line enables us to turn out machines which are incontestably the best. We make them to meet all the requirements of the most approved telephone practice and we incorporate in their design ideas and inventions of our own, which give them an individuality distinct from all others. No matter what you may need, from a carbon brush to a complete power equipment, we make it. When in the market write us and we will quote you the lowest prices consistent with Roth quality.

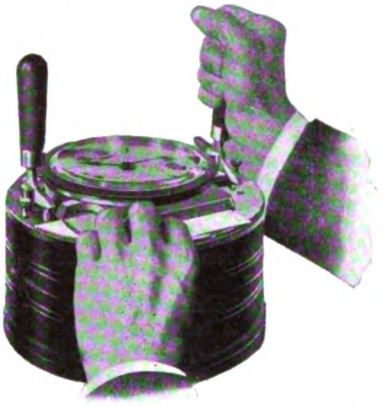
ROTH BROS. & CO., Inc., 27-29 S. Clinton Street CHICAGO, ILL.

Without Any Mental Effort

on the part of the toll operator, the duration of a message can be accurately recorded with the

CALCULAGRAPH

By moving two levers, one when the conversation starts, and the other when it is finished, the elapsed time in minutes and fractions of a minute is automatically printed on the toll ticket.



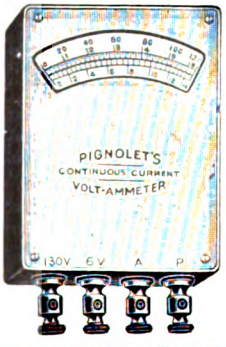
The efficiency of the service is greatly improved by the use of the Calculagraph, as it relieves the operator of her most difficult duty.

IT MAKES NO CLERICAL ERRORS

Write for booklet.

The CALCULAGRAPH CO.
1437 Jewelers Building, NEW YORK, N. Y.

THE VALUE OF A MEASURING INSTRUMENT



Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

BE AS HONEST

with yourself as we are in the manufacture of *International* Apparatus. Give us the opportunity of estimating on your next order for telephones or switchboards. Recent installations in the U. S. and Foreign Countries are convincing.

International Telephone Mfg. Co.
HARRISON AND CLINTON STS.
CHICAGO, ILL.

W. H. CRUMB & COMPANY

Engineers Contractors

TELEPHONE ENGINEERING and CONSTRUCTION

Plans, Specifications and Estimates Promptly Furnished

MERITORIOUS INDEPENDENT TELEPHONE ENTERPRISES FINANCED

1263 Monadnock Bldg., CHICAGO, ILL.

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THE WEEK'S MESSAGES

FINANCIAL.

UPPER ALTON, ILL.—The Star Telephone and Telegraph Company has increased its capital stock from $2,500 to $12,500.

INDIANAPOLIS, IND.—The New Long Distance Telephone Company has declared its regular quarterly dividend of 1 per cent.

ALMA, MICH.—The Union Telephone Company has declared a 2 per cent. quarterly dividend.

LEWISTOWN, MINN.—The Lewistown Telephone Company has increased its capital stock from $10,000 to $25,000.

ROCHESTER, N. Y.—The Rochester Telephone Company has declared its regular quarterly dividend of 1½ per cent.

ADAMSVILLE, O.—The Adamsville Telephone Company has declared a dividend of 6 per cent.

WOODSFIELD, O.—The Woodsfield Telephone Company is to increase its capital stock from $25,000 to $50,000.

HAILEYBURY, ONT., CAN.—The Haileybury and Cobalt Telephone Company has increased its capital stock from $5,000 to $50,000, for the purpose of building a number of extensions, including a long distance line from Haileybury to Cobalt.

FRANCHISES.

LEWISTOWN, ILL.—L. E. Cutler has secured a franchise at Lewistown to build and operate a telephone system, to be known as the North Fulton Telephone Company. He expects to run the company's lines as far as Havana.

NEW ORLEANS, LA.—An Independent telephone company is seeking a franchise at New Orleans. The officers of the new company are as follows: President, Thomas Crouch, of St. Louis; treasurer, L. S. Mitchell, St. Louis; secretary, Philip Werlein, New Orleans. The new company is to have a capital of $2,000,000, with headquarters at New Orleans.

AURORA, MO.—The Farmers' Mutual Telephone Company has been granted a franchise at Aurora.

GLASGOW, MONT.—R. J. Moore has been granted a franchise to build a telephone line from Glasgow to Nashua and from Glasgow to Malta.

ATTICA, N. Y.—The Attica Home Telephone Company, Attica, has been granted a franchise under which it expects to be able to erect and maintain its telephone system and exchange in that city.

FLUSHING, O.—The Stillwater Telephone Company, of Stillwater, O., has been granted a franchise to build and operate a telephone system in Flushing.

PLEASANT CORNERS, O.—The Sandusky Telephone Company, Sandusky, O., is trying to obtain a franchise at Pleasant Corners.

TROUT LAKE, WASH.—The Trout Lake and Glenwood Telephone Company has applied to the commissioners of Klickitat County for a franchise.

COMBINATIONS.

FLORA, ILL.—The Flora Telephone Company has purchased the Friend Telephone system, and a new company will be organized with a capitalization of $20,000.

MATTOON, ILL.—The Mattoon Telephone Company, the Coles County Telephone Company and the Charleston Telephone Company have been consolidated.

PHILLIPSBURG, KANS.—The Enterprise Telephone Company has purchased the exchange at Kirwin.

SUSSEX, N. B.—The Central Telephone Company has taken over the telephone line of the Hampton and St. Martins Railway.

STEUBENVILLE, O.—The National Telephone Company, of Wheeling, W. Va., has absorbed the Phenix Telephone Company of Steubenville.

LOYALSOCK, PA.—The Loyalsock Telephone Company has purchased the rights of the Vallamont Telephone Company, and will build its proposed lines covering Loyalsock township. Other extensions will also be made.

SHERMAN, TEXAS—The North Texas Telephone Company of Sherman has acquired the property of the Whitesboro Telephone Company.

ELECTIONS.

CANTON, ILL.—The Canton Home Telephone Company has elected the following officers: President, Eugene Smith; vice president, N. J. Gorman; secretary and manager, F. W. Plattenburg.

ALMA, MICH.—The Union Telephone Company has elected the following officers: President, Tod Kincaid, Owosso; vice president, James T. Gibbs, Ithaca; secretary, John H. Fildew, St. Johns; treasurer, G. S. Ward, Alma; general manager, W. A. Melchers, Alma.

SPRINGPORT, MICH.—The Springport Mutual Telephone Company has elected the following officers: A. J. Cortright, president; L. A. Carter, secretary; S. T. Doolittle, treasurer; D. C. Hoffman, manager.

SWEDESBORO, N. J.—The People's Rural Telephone Company has elected the following officers: President, G. W. F. Gaunt; secretary, W. B. Gill; treasurer, William Wolf.

CHATHAM, N. Y.—The Chatham Independent Telephone Company has elected the following officers: President and manager, P. G. Babcock; vice president, A. J. Fellows; treasurer, A. N. Van Deusen; secretary, J. C. Carpenter.

CINCINNATUS, N. Y.—The Otselic Valley Telephone Company has elected the following officers: President, J. H. Murray; vice president, P. C. Wheeler; secretary and general manager, A. Fowlston; treasurer, B. R. Corning.

ADAMSVILLE, O.—The Adamsville Telephone Company has elected the following officers: President and business manager, C. H. Hawks; vice president, E. C. Jordan; treasurer, C. A. Guyer; secretary and assistant business manager, C. C. Cazer.

TOLEDO, O.—The Toledo Home Telephone Company held its annual meeting Tuesday, March 13, the following board of directors being elected: One year—Eugene Zimmerman, James S. Brailey, Jr., Clarence Brown, E. J. Marshall and John Manning. Two years—A. H. Bauer, St. Louis; J. J. Robison, R. E. Hamblin, M. V. Barber and Thomas H. Walbridge. Three years—W. F. Robison, Thomas H. Tracy, H. C. Stifel, St. Louis; D. C. Shaw and Jay K. Secor. The by-laws were so amended that five directors will hereafter serve for five years, five for two, and five for one. The officers of the company were re-elected, and are as follows: President, James S. Brailey, Jr.; vice president and secretary, R. E. Hamblin; treasurer, Thomas H. Walbridge. The company reports that 2,000 new telephones have been installed during the year.

NEW COMPANIES.

FORT SMITH, ARK.—The Pan Telephone Company has been reorganized with a capital stock of $120,000, which is to be increased to $250,000. The new capital will be spent in improving the company's system.

YELLVILLE, ARK.—G. A. Ward, D. H. Dodd, R. B. Tegarden, H. H. Galleys, T. N. Matthews and associates have incorporated the G. A. Ward Telephone Company, with $15,000 capital stock.

WALDRON, ARK.—The Citizens' Telephone Company of Waldron has been incorporated with the following incorporators: H. C. Stanton, W. A. Streator, William B. Thurman, W. E. Stone, W. M. Gibson, T. J. Wood and others. The company will establish a $5,000 plant.

APPLETON, ILL.—The Persifer Telephone Company of Appleton has been incorporated with a capital stock of $1,200. The incorporators are F. S. Beamer, R. V. Wyman and J. H. England.

REDMON, ILL.—The Redmon, Isabel and Kansas Telephone Companies have consolidated and a new company has been formed to be known as the Embarrass Telephone Company. The principal stockholders are John Henn, of Redmon, Ill.; E. N. Blair, of Borton, and L. I. Arterburn, of Kansas.

SEWARD, ILL.—The Illinois Mutual Telephone Company, of Seward, has been incorporated with a capital stock of $2,500. The incorporators are Chas. S. Thomas, William McDonald and Geo. D. Bridgeland.

LOCKMAN, IND.—The South Side Telephone Company has been incorporated to construct an exchange and telephone system in Lockman and Brown and Jackson counties.

WESTVILLE, IND.—An Independent telephone company has been organized at Westville with the following stockholders: E. S. Smith, A. J. Forbes, E. W. Weed, E. T. Scott, H. B. Herrold and Jacob Herrold. Connections will be made with long distance lines and Independent lines run in various directions throughout the surrounding country.

ACKLEY, IA.—The telephone exchange formerly operated by Bruening & Symington has been sold to a stock company. The new company is incorporated for $10,000. E. B. Smith, of Waterloo, is president of the company; G. E. McFarland, of Des Moines, vice president; F. J. Martin, of Ackley, secretary, and H. A. Miller, of Ackley, treasurer.

GRAND JUNCTION, IA.—The Junction Mutual Telephone Company, Grand Junction, Ia., has been incorporated with a capital stock of $9,000. President, G. H. Wiltse; vice president, Joe Gannon; secretary, F. O. Van Pelt; treasurer, O. J. Dutton.

RINGSTED, IA.—The Farmers' Mutual Telephone Company has been

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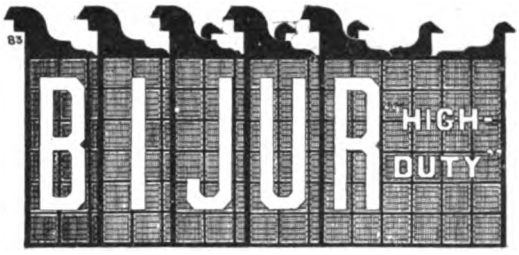
Don't BUCKLE Can't



Built for BUSINESS

Pure lead grilles welded to strong frames. Low charging voltage. Low internal resistance.
20% higher capacity plate for plate than any other.

GENERAL STORAGE BATTERY CO.

GENERAL OFFICES: 42 BROADWAY, N. Y. WORKS: BOONTON, N. J.

BOSTON CHICAGO CLEVELAND SAN FRANCISCO WASHINGTON, D. C. MEXICO CITY

JUST A MOMENT!

Do you realize what the use of good batteries means to your telephone system—even if you don't count the money they save?

HERE—

Good instruments, proper wiring, and good batteries make good service—good service means satisfied users and this means more subscribers.

Think it over. You'll lose ground if you use cheap batteries. Quality counts.

Stromberg-Carlson Telephone Mfg. Co.

ROCHESTER, N. Y.

General Offices, Rochester, N. Y.
Branch Sales Office, Chicago, Ill.

WHY

Do All the Leading Telephone Manufacturers and Telephone Companies use

ROCK ISLAND

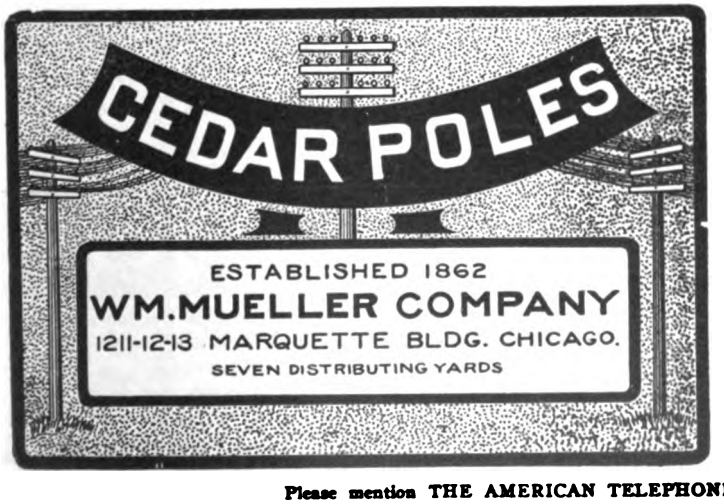
DRY CELLS?

BECAUSE

Every Test they have made has proven them fully 25 per cent. better than any battery they ever used.

Order a sample barrel and convince yourself.

ROCK ISLAND BATTERY CO.
CINCINNATI, OHIO



CORDS :: CABLES :: WIRES

We Manufacture...

Cords for Telephones and Switchboards
Cables and Wires for Switchboards
Cables for Interior Purposes :: :: ::

SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord

Runzel-Lenz Electric Mfg. Co.
97-01 South Clinton Street, Chicago

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THE WEEK'S MESSAGES

organized at Ringsted. A town exchange and a number of rural lines will be built.

MOUNT ANGEL, OREGON.—The Mount Angel Mutual Telephone Company, of Mount Angel, Oregon, has been organized.

SCOTTS MILLS, OREGON.—The Scotts Mills Mutual Telephone Company, of Scotts Mills, Oregon, has been organized.

ELLSWORTH, WIS.—An Independent telephone company has been formed at Ellsworth, Wis. The incorporators are A. Combacker, J. E. Foley, N. N. Buck and W. P. Knowles.

KIRKTON, ONT., CAN.—The St. Mary's, Kirkton and Exeter Telephone Company has been incorporated with a capital stock of $40,000. The directors include W. R. Carr, Kirkton; J. W. Graham, St. Mary's, and I. G. Jones, Exeter. The company plans to connect the three towns by long distance telephone lines. Address W. R. Carr, Kirkton, Ont.

PERSONAL.

F. E. COUVILON has been appointed manager of the Cumberland Telephone & Telegraph Company's exchange at Lumberton, Miss.

R. F. HARDGRAVE has been appointed manager of the Tuscarawas County Telephone Company's exchange at Uhrichsville, O.

B. C. MITCHELL has been appointed manager of the Cumberland Telephone & Telegraph Company's exchange at Dawson Springs, Ky.

C. W. POOL has been appointed manager for the local Independent telephone company, at Tecumseh, Nebr.

E. Y. SANDERS has been appointed manager of the Cumberland Telephone & Telegraph Company's exchange at Boonville, Miss.

J. W. TEMPLE has recently been promoted to the position of special agent of the Cumberland Telephone & Telegraph Company, with headquarters at Union City, Tenn.

MISCELLANEOUS.

OAKLEY, KANS.—The Oakley Telephone Company has been purchased by Mr. Pick, formerly of Bunker Hill, Kans.

SPRINGPORT, MICH.—Stockholders in the Springport Mutual Telephone Company have rejected a proposition to connect with the Bell lines. Connections with Grand Rapids will be obtained over a line to be built by the Citizens' Telephone Company, which was considered to be better equipped to furnish a satisfactory service.

TOLEDO, O.—The Toledo Home Telephone Company reports that a recent peg count kept by its force of 144 operators for a period of 24 hours showed that the girls had answered a total of 186,208 calls for the day, or an average of close to 1,300 for each operator.

CALGARY, ALBERTA, CANADA.—The League of Alberta Municipalities unanimously passed a resolution in favor of municipal ownership of telephone systems with government control of rates. The provincial government will be petitioned to secure powers to expropriate the Bell Company's lines in Alberta.

New Construction in the Field

LOS ANGELES, CAL.—The United States Long Distance Telephone and Telegraph Company is to build about 70 miles of long distance lines.

SAN FRANCISCO, CAL.—The Union Pacific and Southern Pacific Railroad is to construct an Independent long distance line from Omaha to San Francisco. The main line will be 1,800 miles long.

MACON, GA.—The Dublin Telephone Company expects to make many improvements in its system.

ALTON, ILL.—The Star Telephone Company is to construct a line from Upper Alton to Godfrey, and will eventually establish an exchange at Godfrey.

FONDA, IA.—The Northern Telephone Company, of Fonda, Ia., is to build a line from Bisbee to Rolette, at which place it will establish an exchange.

LORIMOR, IA.—The Lorimor Telephone Company is to build a line to Beulah.

RED OAK, IA.—The Red Oak Telephone Company is to build a line from Red Oak to Stennett.

BELLEVILLE, KANS.—The Belleville Independent Telephone Company will rebuild its exchange, making extensive cable installations.

CONCORDIA, KANS.—The Concordia Telephone and Telegraph Company has ordered new central office equipment and will rebuild its system.

LEWIS, KANS.—The Farmers' Telephone Company is to construct a line from Lewis to Rumsey.

MANKATO, KANS.—The Jewell County Telephone Company is to build a full metallic line from Mankato to connect with a metallic line from Belleville, giving connections with Kansas City.

RANDOLPH, KANS.—W. F. Peter is interested in the rebuilding of the telephone line between Randolph and Winkler. A line is also to be built to May Day.

WESTMORELAND, KANS.—The Westmoreland Telephone Company is to build a line southeast from Blaine.

COLUMBIA, KY.—E. A. McKinley and J. N. Murrell, of Cray Craft, are interested in the new Independent telephone line which is to be built from Columbia to Cray Craft.

LAINGSBURG, MICH.—The Laingsburg Telephone Company is to extend its lines in many directions.

STURGIS, MICH.—The National Telephone Company, with an exchange at Sturgis, is to build several additional farmers' lines in Sherman township.

PISGAH, MO.—The Pisgah Telephone Company has commenced the construction of its system.

HARTINGTON, NEB.—The Farmers' Telephone Company, which has recently increased its capital stock to $20,000, is to build a line to Crofton and to St. James.

BOSCAWEN, N. H.—The Canterbury and Boscawen Telephone Company is to build a line to North Concord. Its system will also be extended in Penacock.

TILTON, N. H.—The Citizens' Telephone Company is to construct two new lines.

RATON, N. M.—The Johnson Mesa Telephone Company is to put in a metallic toll line from Raton to Folsom, and to install an exchange at Folsom.

BISMARCK, N. D.—The Capital Telephone Company is to construct a line from Bismarck to Braddock.

EAST PALESTINE, O.—The Unity Township Telephone Company, of East Palestine, is to build lines into Middletown township and Beaver township.

WINDHAM, O.—The Windham Telephone Company is extending its system.

EL RENO, OKLA.—The Canadian Valley Farmers' Telephone Company is to construct several new lines.

CHARLESVILLE, PA.—The Friends' Cove Mutual Telephone Company has commenced the construction of its system. It will connect with the Bedford County Telephone Company.

GROVE CITY, PA.—The Union Telephone Company is building a toll line between Grove City, Harrisville and Slippery Rock.

TURBOTVILLE, PA.—The People's Telephone System, with an exchange at Turbotville, is building lines to Muncy, Dewart, and is to soon commence the construction of a line from Turbotville to Lewisburg.

DELL RAPIDS, S. D.—The Dell Rapids Telephone Company is to extend its system to all parts of the farming region tributary to Dell Rapids, as well as to every nearby town.

EDGEMONT, S. D.—The Edgemont Telephone Company is to extend its lines to the Cheyenne River.

SALT LAKE CITY, UTAH.—The Independent Telephone Company, of Salt Lake City, is building a line to Spanish Fork.

NORFOLK, VA.—Chief of Police Boush has recommended to the police board the installation of a new police telephone system, which will cost $11,600.

HUNTINGTON, W. VA.—The Mutual Telephone Company is to install $8,000 worth of new cable.

MARINETTE, WIS.—The Farmers' Telephone Line is to extend its system in and about Marinette.

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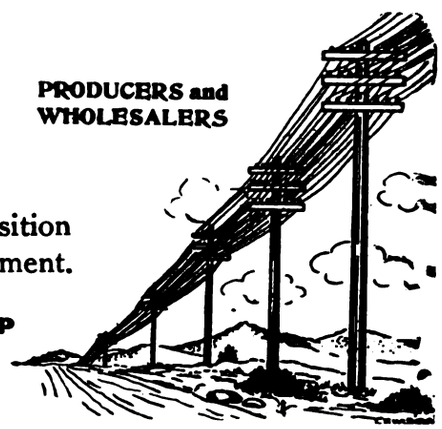

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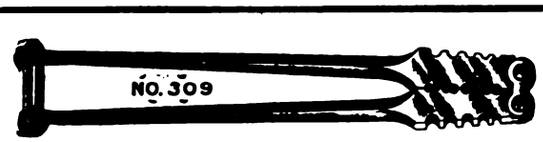

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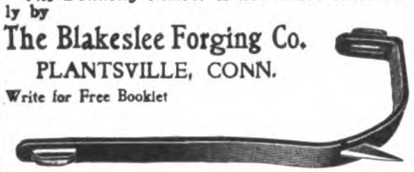

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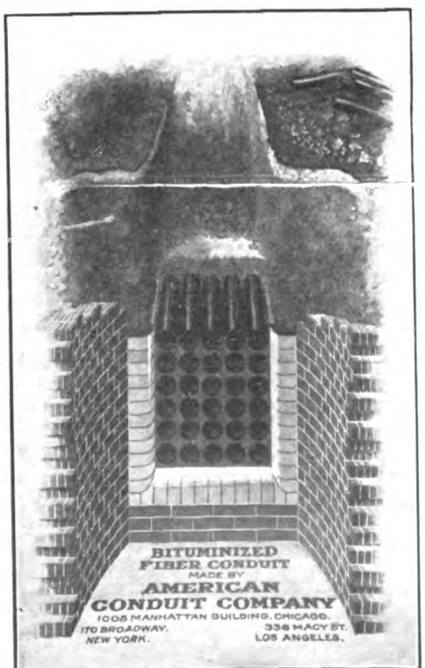

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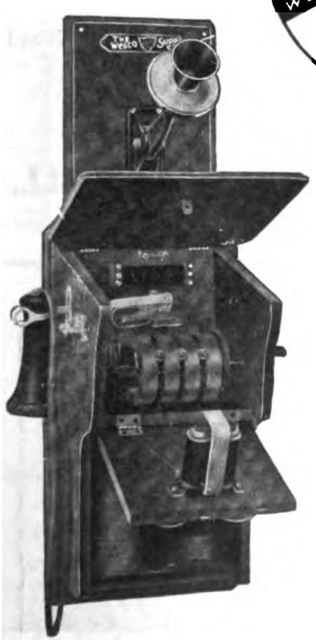

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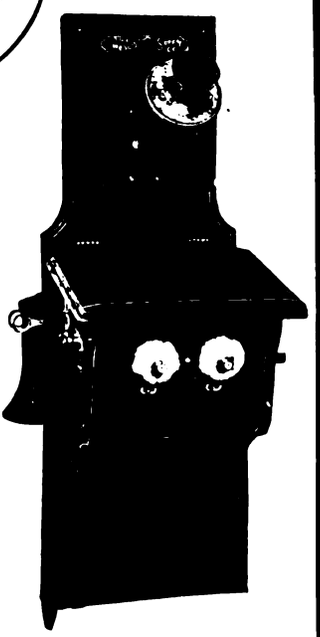

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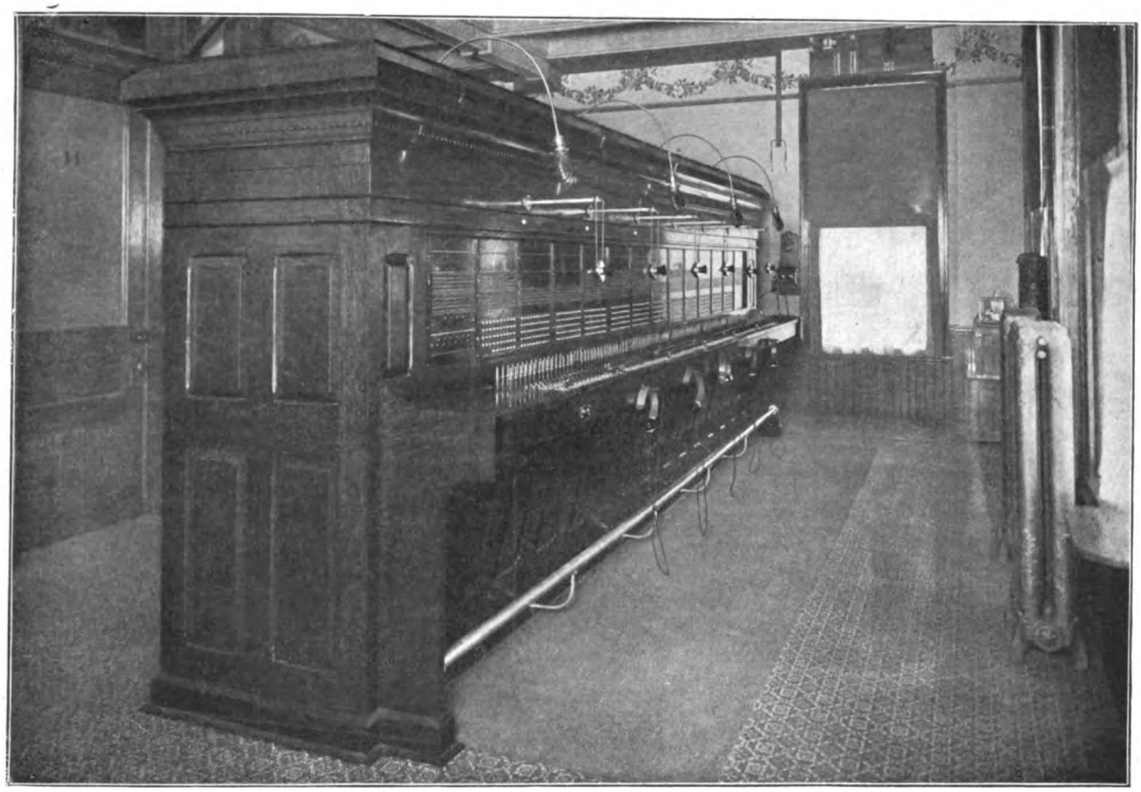

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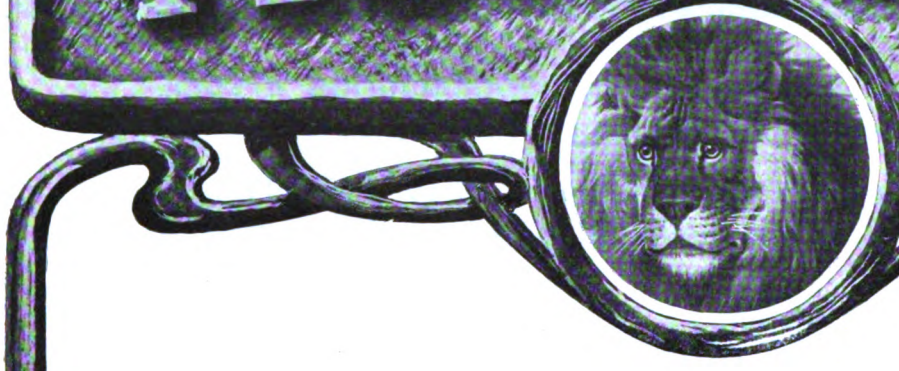

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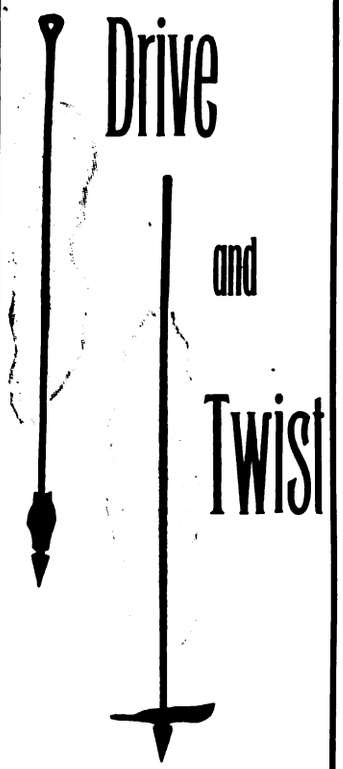

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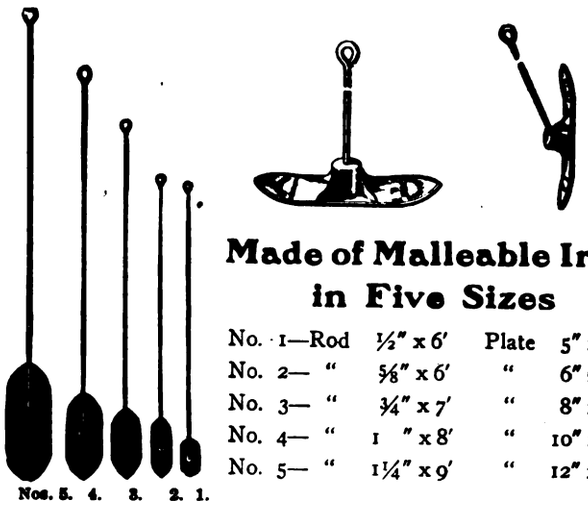

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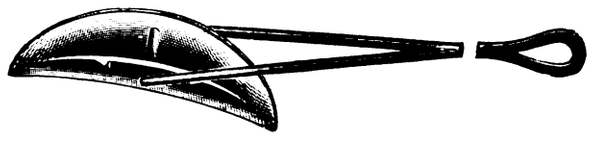

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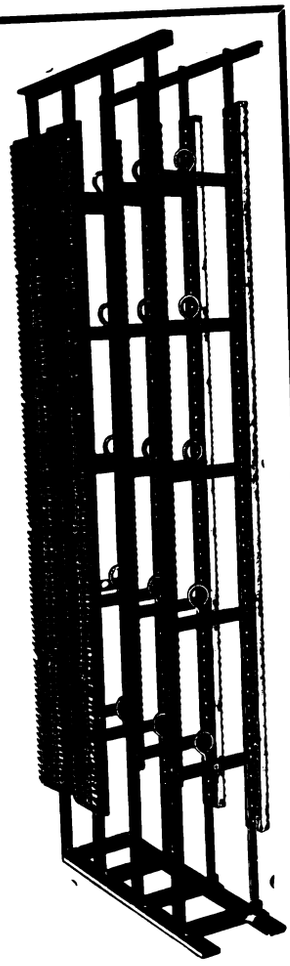

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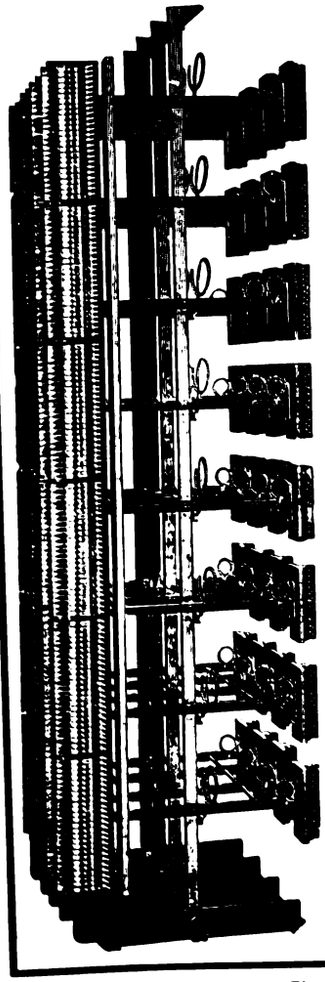

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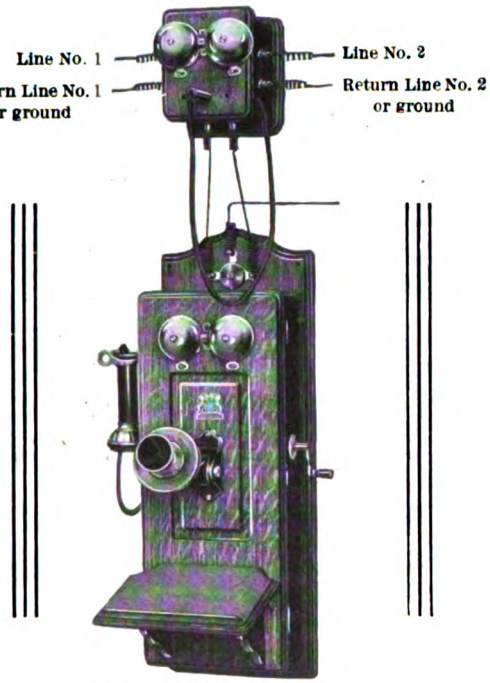

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When plug is inserted in jack as per sketch, lines Nos. 1 and 2 are both connected with the central telephone.

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Stromberg-Carlson

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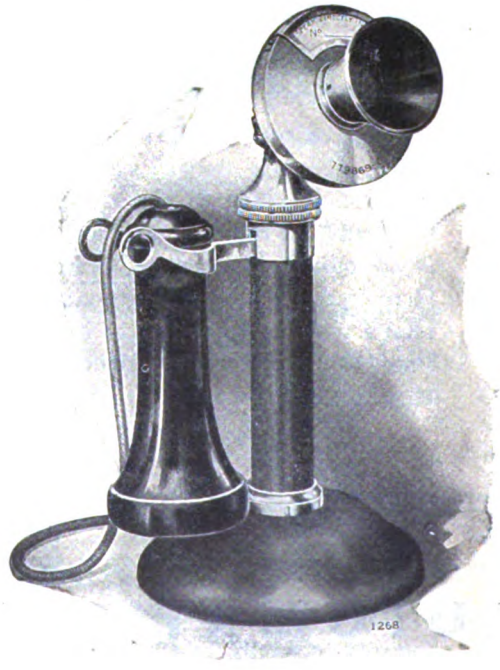
There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?



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NO matter how you try, the best you can do is to protect your apparatus as well as you know how, and to construct your circuits so as to reduce the possibility of damage to a minimum.

Just for the purpose of demonstration let us consider the difference between a twenty-five pair open wire line and a cable of the same capacity.

The open wires offer fifty resisting surfaces to the velocity of a wind, the cable only one. The open wires also offer fifty separate surfaces for the lodgement of sleet and snow whilst the cable only has one. In case of a lightning storm the same proportion exists for the path of the discharges to earth, and, if the cable is properly erected its circuits will not be affected, whilst any or all of the open wires can be grounded or opened.

The action of a heavy wind or sleet storm places a much greater strain upon the poles of an open wire line than those supporting a cable lead and consequently the ability of the former to withstand the abnormal pressure is proportionately less than that of the cable poles.

These facts being true, there is no room for argument as to the advisability of using cable.

...are still coming. De... ...ds far have failed to find Ellis.

FIVE INCHES OF SNOW.

Not Cold in Schenectady, but Its Blizzardlike in Gloversville.

SCHENECTADY N. Y., April 9.—Snow has fallen in this city continuously since early morning, and five inches covers the ground in the residence districts where traffic is not heavy. Telephone and telegraph companies have experienced considerable trouble because of the storm. The weather is not cold.

GLOVERSVILLE, N. Y., April 9.—A storm which more nearly approaches a blizzard than any during the winter began here early to-day, and continues unabated to-night. Trolley, telegraph and telephonic service has felt the effects of the heavy clinging snow.

GAVE TENTH TO HIS CHURCH

...cial to The World.)

KAN... CITY, April 9. ...el W.

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Now, if there is any doubt in your mind as to this being the case, we can furnish abundant and convincing proof. We publish a booklet 79 B, which describes the methods we employ in its manufacture. It takes you through every department and shows the extreme care that is exercised, not only in the actual working of the materials, but also in their selection, and in the final tests, all of which go to make STROMBERG-CARLSON CABLE the standard of the world.

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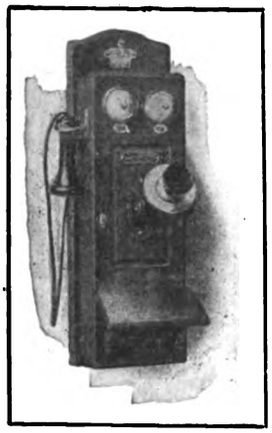

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THIS instrument is designed and built with a view to permanent good service. All parts and material are absolutely **UNIFORM.** Each and every part working in **PERFECT** harmony. This instrument embodies an **UP-TO-DATE-NESS** that is **notably** absent in other makes. Complete specifications of all parts. Prices furnished on application. Immediate shipments.

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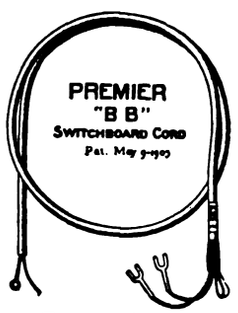

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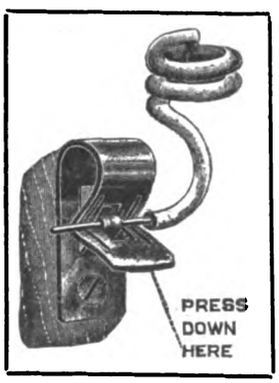
a low grade of wire from your jobber when the order specifically stated Extra Best Best; then why allow him to give you dry cells having the obsolete screw post when your order reads



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Remember it doesn't cost the jobber a cent to get the factory to furnish all batteries with this post.

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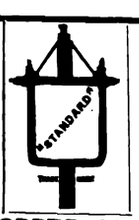
Telephone Wire



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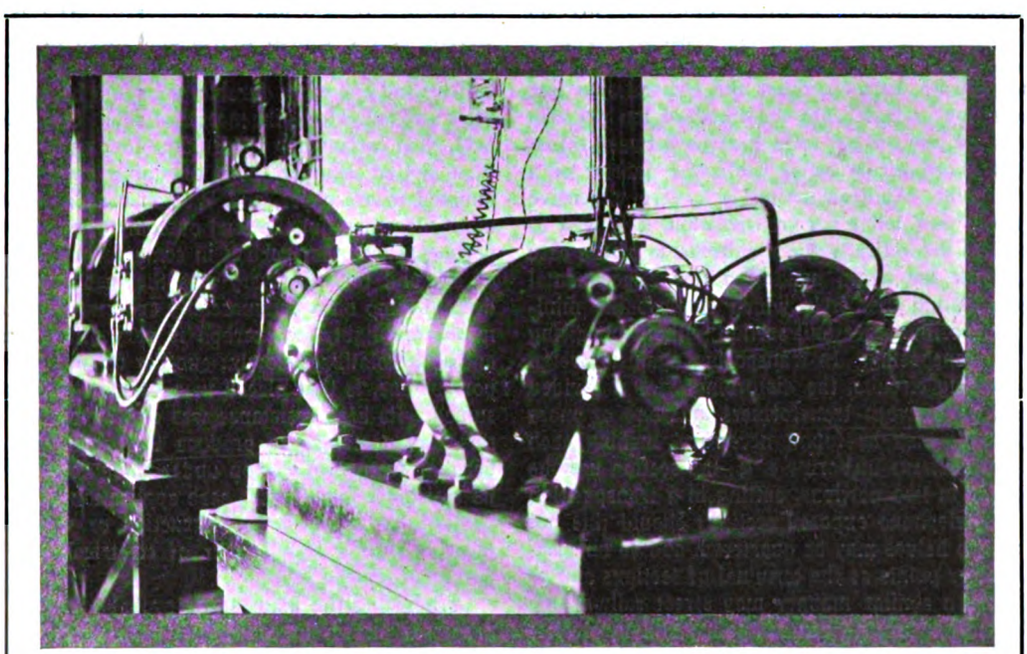
VOLUME XIII *SATURDAY, APRIL 14, 1906* *NUMBER 15*

Power Data for Telephone Men

By P. Kerr Higgins.

CONTINUING our consideration of the transmission of power, we come to the line, and what takes place there is all important to the telephone man. On such a line the principal feature is the frequency which has a specific effect upon the conducting capacity of the line, so much so that the tendency to-day is towards the use of very low frequencies. Inasmuch as it is now possible and practical to use high pressures, the feature of resistance does not receive as much consideration as those of frequency and inductance, which is the limiting influence in high tension circuits. The general effects of inductance are such that impedance appears first and very materially interferes with the capacity of the line to carry current. Any increase in inductance causes more and more separation between the pressure and the current, and such diminution in power emphasizes the difference between apparent power and power available.



Machine Equipment Used in Independent Exchange at Paterson, N. J., for Charging Storage Batteries.

In electric lighting the frequency varies from 50 to 120 cycles per second, the ones most often used in telephone work being 50 and 60 cycles per second. Increasing the frequency forces the current out to the surface of the conductor, and a continued increase will eventually makes the conductor inoperative, the cross section of the wire not being permeated by the electrical energy. The effect on the line is to increase the static effect and inductance with the increase in number of alternations, the current and voltage being separated by such. The variation in the power factor is shown by such separation, being due to the difference in phase between the one and the other, and naturally the more widely the divergence the less power is available. These measurements cannot be made by a volt or ammeter, as they do not show the difference in phase, hence the necessity for using a wattmeter which gives readings in true watts. As previously stated, a transmission line shows four peculiar characteristics: Inductance, resistance, capacity and leakage. A magnetic field of force is always present around a wire carrying a current, of which the lines of force lie in a plane perpendicular to the line. The presence of other conductors in the vicinity and parallel to the transmission line subjects it to the influence of the fields of force of the transmission wire. Wires are not materially affected by earth or ground if the distance between them and the ground is greater than three times the distance between wire and wire, hence the relation between the distance between the disturbing wire and ground and the disturbing wire is very important in considering inductive effects.

Resistance is a function of the line in relation to its length and the diameter of the conductor and the metal of which it is made; it also varies slightly with the temperature. Capacity is the peculiar property of a line to store an electrical charge, somewhat in a similar manner to the condenser, and is known as "electro-static capacity," and is the setting up of a stress between the conductor on one side and the earth or a conductor on the other side, the ether forming the dielectric. As dry air is the best dielectric from the standpoint of capacity, it is apparent that any insulation on the wires only tends to increase the capacity effect. It is opposite in effect to inductance, being increased by the presence of other conductors to ground. We can therefore conceive of a long transmission line loaded down with a current being forced through at a high pressure, that quite a good deal of this is expended in creating an inductive field in its vicinity, and we can readily see that the existence of a telephone line in the neighborhood with its extremely sensitive apparatus, the receiver, will be quick to pick up any changes in such a field, and such changes appear in the form of noise, which is at the maximum in a grounded line and at the minimum in a well balanced transposed telephone metallic circuit. The velocity of such currents is given at 180,000 miles per second, only very little less than light, and the inductive influence is slightly faster than this, being about 185,000 miles per second. All energy spent in heat or leakage is lost;

Continued from the issue of April 7th.

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that spent on the static charge returns to the original line when the supply is cut off.

If the current were constant and uniform, as long as the same conditions existed no noise would be apparent because the noise is due to changes and variation in the inducing current. The magnetic density and power is greater nearest the conductor and diminishes as it gets further and further away from it, in a similar manner to the lines formed in water when a pebble has been dropped into it. Drop two pebbles side by side a few inches apart and the action of one wire upon another can be appreciated; the circles are not exactly the same, but serve to illustrate the action taking place. In order to neutralize such inductive influences we must present to the disturbing wire equal sides or portions of a metallic circuit; there is no cure for a grounded line but to remove it from the vicinity of the disturbing wire. To do the former first one side of the metallic is brought close to the disturbing wire for a predetermined distance, then the other side for the same distance, and the line is cut up in equal parts until a perfect balance is found; this is termed transposing. It must be understood that the metallic line prior to this transposing must be well balanced both as to conductor resistance and insulation resistance, as otherwise time is lost and results will be unsatisfactory. Such transpositions then are simply rotating the current through 180 degrees, which changes their relative positions at each rotation and the exposure of one side counteracts the exposure of the other side. The reason for this is, all induced currents are in opposite directions, and this constant rotation by reversing the currents causes them to neutralize each other. If two or more circuits are parallel to each other it is also necessary to transpose them so as to neutralize the currents mutually induced between the two. This is much harder than the other.

The transposing may be done on either the transmission line or on the telephone line or both. On the standard ten pin arm the sections are divided into quarter mile sections between transpositions. The first transposition being made one quarter of a mile from starting point. As transposing is a very expensive business, costing about one dollar per transposition, it is well to determine more or less theoretically the requirements of the case before proceeding with the work, making a few experimental tests if necessary, adopting that style which employs the minimum number of transpositions per unit section without impairing the efficiency of the transposing. In transposing against foreign wires such as alternating circuits, the disturbing wire is divided off into sections, e. g., between transformers and one or more transpositions cut in as may be found necessary, making each section between transpositions uniform; e. g., the section may be cut in two by dividing in two portions, cutting in a transposition in the middle of the telephone exposed section; should this not be enough then the two halves may be quartered, and so on, considering the transformer points as the terminal of sections and so in a neutral state. In a similar manner may street railways be treated, taking the sub-stations as neutral points and in electric light (arc) systems, taking the lamps as the terminal of sections. The induction from a series arc light circuit is always productive of much disturbance, if parallel to the lines for any length. It may here be noted that when transposing lines against outside interference, all the lines on the pole line must be transposed. In making transpositions it is useless to cut in any more than is necessary to eliminte the disturbance; we so frequently see foremen and others give orders to cut in transpositions on a general principle rather than a specific one; this is waste. If only one pair of wires is on a pole line and no induction is noted, it will be time enough to cut in the transpositions when the other circuit is run or disturbance noted.

When telephone and power circuits must be placed upon the same pole line, it is always necessary and best to have power wires as close together as safety will permit, otherwise the most aggravated conditions, as to inductive influence, will be met with; and in all cases the telephone lines should be below the high tension lines. The writer strongly advises against the joint use of pole lines by telephone and power companies, owing to the danger which is always present, and when the voltage of such circuits is over 5,000 volts it is extremely dangerous. An important feature of every line, whether telephone or power, is the leakage factor. It is a good practice, and one which has been more or less neglected of late by both telephone and power companies, to patrol the lines with a view to keeping up the insulation to a high standard, replacing broken glass, tying in wires which have become loose, clearing trees, branches, kite strings and anything and everything which would have a tendency to impair the insulation of the line. It would also be well from time to time to clean the insulators, as these in time become incrusted with dust, etc., and cause more or less leakage.

Those who are concerned with the maintenance of all electrical apparatus in an exchange may find interesting a certain amount of information concerning the lamps in use for electric lighting. The development of the incandescent lamp began with a glass bulb from which the air had been driven and in which a wire was placed which was heated up to a white heat. It was noticed during the progress of this evolutionary stage that the light increased in brilliancy as the vacuum in the globe was increased, and this led to the use of the mercury vacuum pump, and the discarding of the old air pump, consisting of a cylinder and piston. This improved method of producing a more perfect vacuum made further strides in the development of the lamp possible. The resistance of the wire was increased, then platinum wire was tried, but in all of these experiments the volatility was a drawback and a limit to the brilliancy. It was possible by the use of a high current to bring these wires up to a high state of brilliancy, but on account of the fact that the wire soon became fused the use of platinum wire was finally abandoned. At this time Thomas A. Edison of the United States and Swan of England were both working along the same lines, endeavoring to develop a filament which would be more durable, the result being that carbon in some form was found to be the most desirable. One treated threads with acid, then carbonizing them; the other used bamboo fibre treated in a similar manner, both obtaining good results. Maxim attempted to use paper, and Weston used a cellulose compound to make filaments, but the final outcome of the investigation and experiments was that carbon in some form was the most desirable of all, and this discovery was the means of placing the incandescent lamp on a commercially successful basis. As we can see in the arc light, etc., carbon is very difficult to soften by heat, and so it volatilizes slowly; another feature of carbon, and an important one, is that placed in a vacuum it does not become consumed. Its high resistance was also favorable to its adoption, as this was necessary to produce the required white heat. One peculiar feature of carbon under these conditions is the fact that its resistance lowers with each application of the current and may account for its ultimate destruction or volatilization. The filament is thus a transformer of electrical energy into thermal energy producing light.

Carbonizing the filaments is probably one of the most delicate processes known in connection with electric lighting. The filament forms are placed in a bed of powdered charcoal, direct contact with the air being prevented for a long time. These are placed in an oven in which the temperature is gradually raised to a red heat, the charcoal acting as a preventative of the possibility of the filaments being reduced to ashes by contact with the air. The filaments must be made of very fine grain and be homogenous throughout. When taken out of the oven they are hard and elastic and have to be handled very carefully. Flashing of these filaments is an important feature of the completion of the filament; this is done to even up the surfaces, which have sometimes blowholes and other imperfections, and is accomplished by bringing them up to a red heat in a hydrocarbon gas, such as naphtha vapor. Such flashing almost invariably produces a uniform surface resulting from the deposit of carbon. The filaments are all examined microscopically. After such treatment a certain springiness is observable, as is noticed in the completed lamp. This process of carbonizing while uniforming the surface reduces the resistance; hence rare judgment, care and experience is required in making the requisite exposure to current

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and gas. This is necessary to obtain equal wattage and candle power for commercial use. It may here be remarked that the bamboo and thread filaments are now obsolete and a viscous nitro-cellulose solution has taken their place. The process consists in forcing under pressure, through a vessel containing alcohol, a cellulose solution, which is then received on a reel. A filament thread is used, which looks like the small gut string on a violin. After drying it is cut up into strips of suitable sizes and is carbonized as already explained. In the carbonizing process the variable thickness of the filament is overcome by varying the duration of exposure, which is made longer for the thicker filaments, and making tests for voltage and amperage to get the proper resistance. This flashing process practically completes the filament which is ready for being placed in the bulb. The wires connecting the outside terminals and the filament are of platinum and pass through a glass base into the bulb. Several experiments were tried with various metals, and platinum decided upon because of its co-efficient of expansion, is practically equal to that of glass. This prevents a rupture of the glass, which would permit the air to enter and destroy the lamp's efficiency. The uniting of the platinum wires and the filament ends is made by a special conducting cement, put together by flashing, using either a carbon gas or liquid to form the deposit. This cement must be hard so as to withstand the heat. Such a joint is known as a graphite joint.

The life of an incandescent lamp is dependent greatly upon the voltage, hence a uniform voltage is conductive to longer life. The causes of giving out and breakage are the entrance of air, vibration, variable voltage and fracture. The loss between the power put in and that taken out is very great. This may be seen in the fact that a 16 candle power lamp takes about 3.5 watts per candle power, or a total of 56 watts; if no loss existed in the transformation of heat into light only 2 or 3 watts would be consumed for 16 candle power. The results from different makes are variable, no two being the same, either as to efficiency or loss. The resistance in the lamp varies as the candle power is increased, being at its highest when cold and at its lowest when at its highest candle power. Treated carbon filaments give much higher efficiency than those untreated, but the average candle power illumination per lamp is less, as also the output, but the resistance is more in the treated lamp. The manufacture of the lamp bulb is done in two portions, that holding the filament or base and the bulb proper. The former is pushed into the latter, using a blow pipe. The tip of the bulb is originally a long glass tube, which is used as an exhaust to take out the air from the bulb, which is then closed up by means of a blow pipe. To the completed lamp is attached a metal base of two rings for the contact points, using plaster of paris for the cementing process.

In the case of arc lamps the series system is frequently used, and in such cases the lamp requires a given current and pressure so as to get the required candle power. The old style of lamp used about ten amperes at 50 volts; the latest type, with enclosed globe, uses 12 amperes at 80 volts. In the open arc style the carbons burn exposed in the air, in the enclosed types they are burned in an enclosed space. In the open arc the consumption of the carbon was much greater, so that while in the open arc they were good for ten hours, in the new enclosed arc they may retain their usefulness 100 hours; this means a considerable saving in labor. Such lamps may be used on constant potential and constant and alternating current systems. The current used is pulsating, the pulsation being effective in keeping the arc light mechanism well adjusted. The candle power of arc lamps is rated as spherical or horizontal, the former being that distributed on all sides of the arc light; the latter that measured by the horizontal plane method being the effective candle power produced. In arc circuits using the alternating current it is necessary to use a hood or reflector on account of the reversal of the arc, the crater being first above, then below, and constantly reversing, the reflector tends to catch all these rays and produces a uniform light, which could not be obtained otherwise.

Warning to Independent Managers

A LETTER FROM THE PRESIDENT OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION SUMMING UP THE "CONNECTION FOR TOLL SERVICE" PROPOSITION.

REASONS why Independent exchanges should refrain from making any connection whatever with Bell exchanges are most clearly and forcibly set forth in a letter from President James B. Hoge, which we print upon this page. This letter was written to an active officer of an Independent company which had been approached by the Bell company for the purpose of securing its long distance business. The National-Interstate Association is glad to send out information of this sort in a personal letter wherever such action is desirable, but it thinks at this time, when the Bell is making such strenuous efforts to tie up Independent companies for a period of years, that the publication of such a warning letter will enable it to reach many managers who are perhaps a little doubtful and uneasy.

The association has information from all over the country and is able to take a broad, clear view of the situation. This is likewise the case with the Bell Telephone Company. Both organizations see the same thing coming in the near future; that is, the development of an Independent long distance system which shall give to the manager of every Independent exchange service with whatever parts of the country he may desire connections. The Bell company wishes to take advantage of the lack of thorough knowledge on the part of local directors and owners to hasten connection with its lines. The National-Interstate Association wishes to convey information which will enable every Independent operator to see for himself that his best policy is to wait a little longer and secure the benefits of long distance service without the disadvantage which comes from tying up with the Bell companies. The nature of these disadvantages will be evident from an examination of the letter which is as follows:

THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

CLEVELAND, O., March 20, 1906.

Dear Sir: It has been brought to my notice that the Bell Telephone Company is negotiating with your people in regard to having you make connections with its lines. I take this opportunity to warn you against making any connection whatever with them. There is not one good reason why you should do so, many why you should not.

Your company, as I understand it, is thoroughly Independent and fairly prosperous. *Why were you organized?* Was it not to secure for the people of your locality good telephone service at fair rates, which the Bell would not give you, and develop territory which it absolutely refused to touch? How many of your subscribers would be enjoying the benefits derived from telephone service to-day if the Bell had retained control of the field and been able to keep Independent companies from doing business? I venture to say not one in ten. *What have you to gain by connecting with the Bell now?* You have built up your properties, not only without its help but in spite of its opposition. Now, when all its efforts to drive you from the field have proven fruitless, it is not only willing but anxious to make contracts with you, probably on almost any terms you care to name. Is it for your own good that it is willing to do this, and will it protect your interests in any contracts it should make with you? Don't you believe it! It wants the business which you control and which it can get in no other way. Remember, too, that this is business that it never would have developed itself.

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We can only judge future actions of individuals or corporations by the record of their past. How did the Bell act when it had the field to itself? Its history shows that it charged exorbitant rates, gave any sort of service that suited it and developed only portions of the country where it could reap enormous profits. When the Independents entered the field it resorted to everything possible to crush them or drive them out. By cutting rates and often actually giving away service it succeeded in driving an Independent company here and there out of business. Then what was its policy? It immediately raised its rates to what it had been charging before, and sometimes even higher, thus getting back from the people the money it had spent in driving the Independent companies out of business.

Let me cite one instance. South Bend, the St. Joseph county seat in Indiana, is a town of about 22,000 people. Up to 1896 the Bell Company had a monopoly of the telephone service there. It had had control for a number of years and might have been expected to have the territory pretty well developed. Did it? Here are the facts. It had just 240 subscribers and the rates were $24 per year for residence service, $48 for business. Fairly profitable rates, we must admit, considering the number of subscribers. The South Bend people organized an Independent company which commenced operations with about 500 subscribers, over twice what the Bell had after years of exclusive control. The new company charged $18 for residence service, $36 for business. The Bell at once cut rates, charging $18 for residence and $25 for business service; in fact, the Bell gave service at any price, its only object being to drive out the Independents. After four years it succeeded in buying them out—and then? Why, it had to make good the losses sustained in its rate-cutting campaign, so telephone prices were at once boosted to $30 and $48. They remained there till the Home company once more entered the field. Then down came Bell rates again in the hope of turning the trick a second time, but, as one of our most famous statesmen remarked, "You can fool all of the people some of the time, some of the people all the time, but not all the people all the time," and this time the South Bend folks were wise. That they have not forgotten the lesson taught them by the Bell is clearly shown by a comparison of the rates charged at South Bend to-day and the number of telephones that each company has in service. The Bell rates for residence and business, respectively, are $20 and $30. It has rates even as low as $15 and gives considerable free service. Anything to get the business away from the Independents. The Independent's rates are $24 and $36. The following, from a report received last summer, shows the relative standing of the companies:

At South Bend there are	2,718	Independent telephones,	878	Bell
In St. Joseph's county...	3,612	" "	992	"
Divided as follows.....	1,112	" business "	465	"
	2,107	" residence "	487	"
	393	" farmers "	40	"

Five hundred and forty-seven of the Bell subscribers also have a Home telephone and a large number of its subscribers are on party lines. The Independents are adding to their list right along; the Bell is scarcely holding its own. "You can't fool all the people all the time!" This is a typical case. I could cite many others for the State of Indiana alone.

Cleveland, Ohio, furnishes as good an example as any in the country of the way in which the Bell can be forced to come to time when confronted with the right kind of opposition. The Independent local company there is the Cuyahoga Telephone Company. It commenced doing business in 1899, at which time the Bell had 5,600 telephones and was charging $125 for business, $72 for residence service, with any sort of service it cared to furnish. You didn't have to take its telephones, you know; if its rates didn't please you or the service was unsatisfactory, you could go without. Here are its rates to-day:

	Per Year.
Business—Individual line, unlimited.....	$84
Four party line as low as.....	36
Residence—Individual line, unlimited.....	48
With measured party line service as low as.....	24

The Cuyahoga Telephone Company is charging at present:

Business—Individual line, unlimited.....	$72
Four party line unlimited.....	48
With measured four party line as low as.....	30
Residence—Individual line, unlimited.....	48
Four party line, unlimited.....	24
With measured four party service as low as.....	21

The Bell Company claims to have 25,000 telephones in service. It probably has not less than 21,000. The Cuyahoga, as a matter of actual record, had on March 10th 21,646 telephones. The Cuyahoga is growing at the rate of 35 per day, and within the next few years, I feel safe in predicting, will have many more telephones than its competitor.

The people realize what they owe to this Independent company and are proving their gratitude in no uncertain way. The following letters from Cleveland business men, which are only two of a large number we have on file, show how highly Independent telephone service is regarded by the business interests of this city:

CLEVELAND CITY FORGE AND IRON COMPANY.

Cleveland, O., March 13, 1906.

Mr. George W. Beers, Cincinnati, Ohio.

Dear Sir: In reference to having two telephone systems in a city, we can speak from experience in Cleveland and can truthfully say that with the advent of the Cuyahoga Telephone Company here we immediately experienced a reduction in rates, improved service and a large increase in subscribers. We feel that it is a good thing for any city to have competition in any field and are very glad that the Independent movement started several years ago is steadily growing in other cities.

Yours very truly,

(Signed) R. A. HARMAN, Vice-President.

THE NATIONAL-ACME MANUFACTURING COMPANY,

Makers of the Acme Multiple Spindle Automatic Screw Machine.

Cleveland, Ohio, March 1, 1906.

Mr. Geo. W. Beers, Cincinnati, Ohio.

Dear Sir: The contract department of the Cuyahoga Telephone Company has asked us to write you relative to our experience with their service in this city.

Since the first installation of their service in this city we have been pleased with same, especially so in view of the modern equipment which has recently been installed. They give excellent attention to the boards; have always been very courteous and prompt in their attention to their customers. We can cheerfully make this statement, for we have had so much better service than we have been able to secure over the Bell lines.

Yours very truly,

THE NATIONAL-ACME MANUFACTURING CO.

(Signed) O. S. Werntz, Treasurer.

From Ohio to the State of Washington is a far cry, but I want to call your attention at this time to the situation at Seattle, with which, perhaps, you are already familiar. Over 2,000 of the business men of the city, subscribers of the Sunset Telephone Company (Bell) held a meeting at the Opera House on February 21st to take united action against the Bell. Notices to remove Bell telephones were signed and placed in the hands of a committee, to be served just as rapidly as the Home Company could install instruments to take care of those throwing out the Bell.

What does this prove? First, that the Bell, despite the many severe lessons taught it by the Independents, is the same greedy, domineering, arrogant corporation it was in the palmy days of its monopoly wherever it has undisputed control. Second, that the people are determined to have justice in telephone service and rates and realize that they must depend on Independent companies to secure it.

While we are considering this part of the country, Portland, Oregon, should not be overlooked. The Bell Company there, something over two years ago, purchased the Independent plant. As elsewhere, it returned to its same old way, once it had the field exclusively. In less than a year Independent telephone men, taking advantage of the referendum law of Portland, were successful in having the matter of a franchise for a new Independent

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company left to a public vote. The result: 13,350 for a new Independent franchise, 320 against this. The franchise was granted and an up-to-date Independent system is at present being installed at Portland.

One more example from Ohio, this time showing an Independent company's estimate of the value of Bell connections. The Morrow County Telephone Company has headquarters at Mt. Gilead, with exchanges and toll lines throughout Morrow county. Last summer a Bell spellbinder induced its management to connect up with Bell lines for long distance service. The advantages to be gained by the Morrow county people were set forth in glowing terms. So the connection was made. The result? Well, the Morrow County people have severed that connection. How they *didn't* find it to their advantage to continue it is described in the letter from them:

Mt. Gilead, Ohio, July 19, 1905.

James B. Hoge, Esq., Cleveland, Ohio.

Dear Sir: As you are no doubt aware, this company tried the experiment of allowing the Central Union or Bell Telephone Company to connect up its wires with the two principal exchanges of this company. The reason this was done was that we had heard so much about the benefits our company would derive, etc. We are anxious to do whatever was for our best interest and prevent possible competition. The connection was made on May 9th and continued until July 18th. We tried to give the matter a fair and exhaustive trial. All our subscribers were advised of the connection and allowed their choice of service. We found that nearly 90 per cent. wanted the Independent connections and that we could reach many more stations over the Independent line than we could over the Bell lines.

During this entire period we had but very few calls for points reached exclusively by the Bell and had several dozen calls that could not be reached over the Bell line.

After carefully considering the matter from every side, we were forced to come to the conclusion that the connection was of no benefit to our company and much to our disadvantage and annoyance in many ways, even had it been possible for us to have continued the connection between both the U. S. lines and the Central Union or Bell lines. We ordered the connection severed. We did this with a full knowledge that the Central Union or Bell Company would put in an exchange and make us what trouble they could.

With our best wishes for the future success of the Independent telephone movement in Ohio and elsewhere, we are

Yours truly,

MORROW COUNTY TELEPHONE CO.
A. A. WHITNEY, President.
MARK COOK, Secretary.

The foregoing examples are selected from a large number which might be cited covering all parts of the country. In bringing them to your attention my object was to show:

First—That the Bell's policy at present is the same as it was in the past and never can command the confidence of the people.

Second—That the Independent companies are growing stronger every day and, in direct competition with the Bell, are proving their superiority.

Third—That the people are with the Independents and that if the Independents wish to retain the support of the people they must remain INDEPENDENT not only in name but in fact.

You cannot be an *Independent* company and connect in any way with the Bell. You cannot serve two masters. You must choose between the people and a greedy corporation. Compare the management of the Bell and Independent properties. The former is controlled by men who have no interest in any of the plants they operate beyond the profit they can gouge therefrom. Why should they develop new territory unless enormous profits will be the results? What does it mean to them that the people need the service and that with proper management a fair return can be secured at reasonable charges? The prosperity of any locality means nothing to them, except that it might make it possible for them to force still greater returns from it.

On the other hand, the Independent companies are "Home" companies in the real sense of the word. Local people are interested in the local plant, hold its securities and control its destinies. These people are not only interested in seeing it prosperous as a telephone company, but in making it contribute to the general prosperity of the community by furnishing good service at reasonable rates and developing the new territory as needed. They are men whose civic pride is greater than their lust for dividends and who think the practice of the "golden rule" in telephony is not incompatible with good business sense.

The Bell has no interest whatever in the Independent companies except to get them out of business. You can't afford to treat with that corporation in any way. If you do, sooner or later, by hook or by crook, you will find yourself controlled by it, and from the very start you will be regarded with suspicion by your fellow Independents and by the people. It will be hard to convince them that there is no treachery contemplated in your trafficking with the Bell.

The Bell is naturally trying hard to regain control of the telephone business of the country. Suppose it should succeed (although such a thing is, of course, out of the question), what then? Why, it would do as it did before the Independents freed the people from its tyranny, charge "all the traffic would bear," give whatever service it saw fit, develop new territory when it got "good and ready" and in general live up to its "public be damned" policy. The Bell, however, will never regain control of the telephone field. Already, in spite of the seventeen years of Bell monopoly, the Independents have over three million telephones throughout the country to about 2,500,000 of the Bell, and in States where the Independents have been firmly established they are far in excess of their competitor. Indiana and Ohio are fair examples of such States. In the former there are 175,000 Independent subscribers to about 40,000 for the Bell. In Ohio 227,271 Independent telephones are in operation against 108,991 Bell.

The Independent movement cannot be stopped because it is the movement of the people against monopoly. All efforts to retard it will only result in disaster for those who attempt it, and it remains for each Independent company to decide for itself whether it will form an alliance with the Bell and eventually be forced out of business by new Independent companies or whether it will remain *Independent* despite all the lying promises and schemes of the Bell and be with the Independents in the day of their success.

The bulletin issued by the Indiana Independent Telephone Association for last month (copy enclosed) contains two splendid articles along this line. I want you to read them. One is entitled "Two Systems" and shows forcibly how there can be nothing in common between our Independent people and the Bell. The other, entitled "A New Line of Attack," calls attention to and shows the danger of just such an alliance with the Bell as your people may be considering. Read them both. They contain much food for Independent thought.

In a letter like this it is not possible to more than sketch the situation. All the cases cited are actual facts selected at random from hundreds we have on file. For a comprehensive history of the Independent movement let me refer you to an article in the *Atlantic Monthly* for February, written by Jesse W. Weik, president of the Greencastle (Ind.) Telephone Company, and to Paul Latzke's articles running in the *Success* magazine entitled "Fighting the Telephone Trust." Two of these have already been published in the February and March numbers.

That these articles are attracting widespread attention and placing the Independent telephone situation squarely before the public is proven by the review of Mr. Weik's article given in the *Review of Reviews* for March and the increase in the sales of the magazines containing the articles. What does it mean? Merely that the people are being educated up to the true situation and will be more than ever the friend of the Independent companies as they become familiar with the Bell history and methods

So it is up to the Independent companies to remain strictly Independent—there is no neutral ground—if they want to retain the confidence of the public and the respect of their fellow Inde-

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pendents and continue to share in the prosperity with which the Independents are everywhere meeting.

I sincerely trust you will be successful in convincing your people of the danger of any alliance at this time, no matter how disguised, with the Bell interests. Just at present the Independents in your State need the help and support of your company, but not half so much as your company will need their help and support in the very near future. Be true to your friends, the people, and your fellow Independents and have nothing whatever to do with the Bell. With best wishes, I am

Yours very truly,

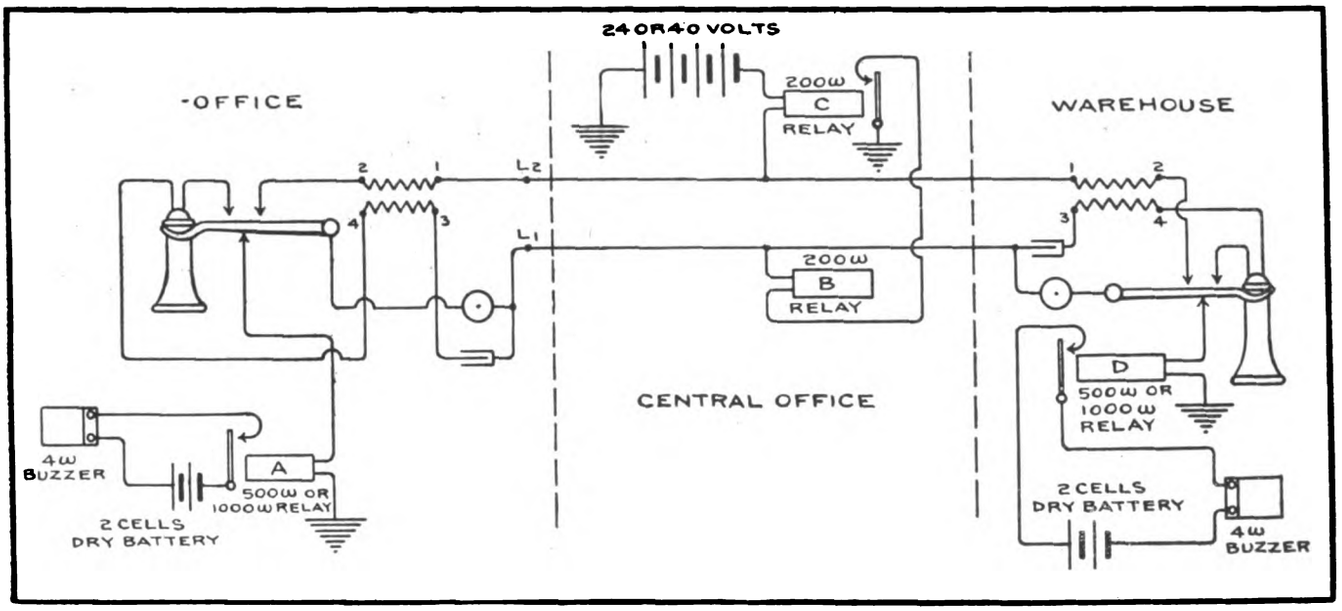
(Signed) Jas. B. Hoge, President.

A Circuit for Private Connection Between Two Common Battery Instruments

By E. B. Jackson.

FREQUENTLY the manager of a common battery central office has to provide for a private line between two stations in separate parts of a town, which are so located that the connecting wires pass through the exchange. In this arrangement the line from one station is usually brought in through the cable to the main distributing frame, and at this point is cross connected to another cable, by means of which it is led to the second instrument.

It is commonly the custom to install magneto instruments upon such a line, using the ordinary ringing generator and local battery for talking. The disadvantages of this plan are obvious, as they bring upon the telephone company the anonyance and expense of maintaining two individual sets of station batteries, and cause the subscriber the labor of ringing for each connection. The troublesome features of this are especially evident to one accustomed to common battery service.



Circuit to Provide for Connection Between Two Stations by Wires Leading through Central Office, With Automatic Signalling and Common Battery Transmission.

The circuit shown upon this page was devised to secure the benefits of a common battery circuit for such a line. It has been in operation between an office and a warehouse in the same exchange district for over a year, and has given good satisfaction. It will be obvious that two cells of dry battery and a four ohm buzzer are necessary at each subscriber's station for signalling; but, as the amount of current used is not great, the same objections do not apply to cells for this purpose that are urged against local batteries for transmission.

The method of operation can be readily traced. For instance, assume that a subscriber at the office wishes to call the warehouse. He simply removes his telephone from the hook, and this causes negative battery to flow through the 200 ohm relay C to L 2 side of the line; thence through winding 1, 2 of his induction coil, contact of hook switch and the switch itself, out through transmitter to L, I, through transmitter at the warehouse, hook, hook contact, relay D to ground. This energizes relay D, and closes its local circuit, causing the buzzer to be operated. It will be observed that the completion of this circuit causes the relay C to be energized, which closes the circuit from the winding of the relay B to ground. This, of course, shunts relay D, but the windings of the two relays are so proportioned that the operation of the relay D is not affected. When the telephone is removed from the hook at the warehouse instrument, relay D is de-energized at once, and the ringing of the buzzer stops. As the battery is supplied through relays B and C, having sufficient impedance to act as an ordinary retardation coil supply system, the lines are available for standard common battery transmission.

INDIANA TELEPHONE COMPANIES URGE CINCINNATI COUNCIL TO GRANT INDEPENDENT FRANCHISE.

THE Indiana Independent Telephone Association of the Eleventh District, composed of the counties of Bartholomew, Brown, Dearborn, Decatur, Jackson, Jefferson, Jennings, Ripley and Ohio, at a recent convention petitioned the City Council of Cincinnati to grant to an Independent telephone company willing to furnish service connections with Independent telephone companies surrounding Cincinnati a franchise to establish and operate a telephone system in that city. The district represents ten counties, twenty-five Independent telephone companies, 15,455 subscribers and 12,000 stockholders in all lines of business. These have traffic relations with the vast system of Independent telephone companies not only throughout Indiana, but also the Central West. It is said that the pressure now being brought from all directions is likely to influence the Council to grant the Independents a foothold in Cincinnati.

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QUERIES

USE OF PILOT LAMPS.—(682.)

I noticed that some time ago in switchboards in our territory a pilot lamp was installed for each position, located high up in the middle panel, and operating in connection with any line lamp burning at that position. Some time since a change was made, and switchboards were equipped with one pilot lamp for each panel. This was located low down, below the answering jacks. As this change makes the circuit more expensive to wire, I should be glad to have you tell me what advantages are derived from the practice in order to make it worthy of adoption. C. L. J.

Formerly it was the practice to locate the pilot lamp at the top of the switchboard panel in front of the operator in order that the monitor could tell whether the business at the position in question was being properly handled. At this time it was usual for the business to be supervised by a monitor located at a desk in a part of the operating room from which she could readily see the face of the switchboard. It was her duty to keep watch on the pilot lamps located in the upper part of the panels, and in a case where a lamp was burning for an undue length of time she would make an investigation and determine whether or not the operator was too heavily loaded, or for any other reason neglecting to answer calls as rapidly as the line lamps were lighted. The operator, whose eyes are naturally attracted to the

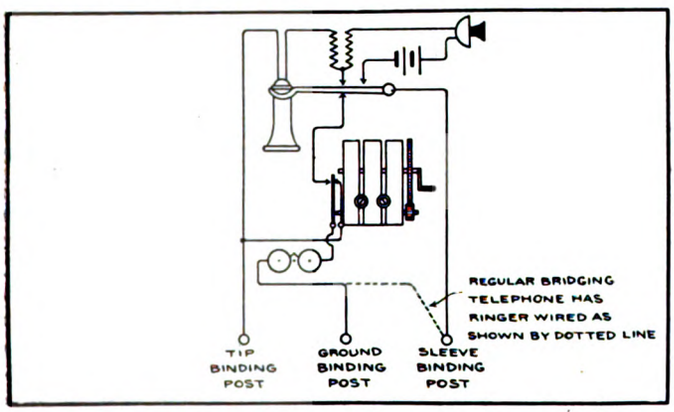

Fig. 683a.

lower part of the switchboard, was compelled to rely upon observation of the line lamps themselves in order to determine when a call was received, and the pilot lamps were of practically no assistance to her. They served merely as a check upon her work

With the introduction of the system of supervision by a monitor patrolling behind the operators, with a group of a definite number assigned to her care, it became possible to make a change in the method of using pilot lamps, which was believed to enable an improved efficiency in the service to be obtained. This results primarily from the fact that a large and comparatively brilliant pilot lamp obviously will more certainly and rapidly attract the attention of the operator to the part of the panel in which the call appears. For instance, if an operator should be in the act of calling a subscriber whose line is connected to a multiple jack at the extreme right of the section, it is possible that she might not instantly detect a signal coming in on the left hand answering jack panel; but the greater brilliancy of the pilot lamp would more quickly cause her to turn to this call, and she could be prepared to answer it while completing the connection to the first number. The monitor, being located behind the operators, in a position where she can readily see the switchboard over their heads as she walks up and down, has no difficulty in seeing the pilot lamps in the lower positions and she relies upon these for the same sort of supervision formerly exercised by a desk monitor.

An additional advantage which is derived from their location in each panel comes from the fact that the patrolling monitor, who, while she is at one end of the switchboard, observes a pilot lamp burning in a panel which may be readily reached by either of two operators, can at once determine which operator should answer the call, without waiting to pick out the particular line lamp, and this facilitates the distribution of business amongst the operators during rush hours.

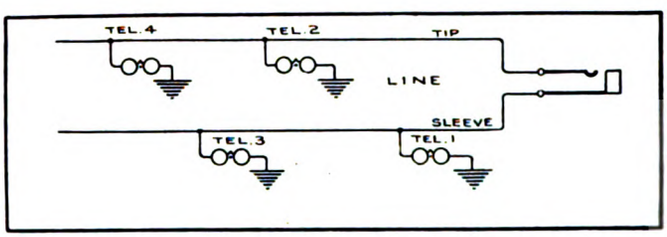

Fig. 683b.

CHANGING TO DIVIDED CIRCUIT SYSTEM.—(683.)

We have several farm lines and would like to change them to work on the divided circuit system. Our lines are full metallic. Must we use a pulsating current generator in each telephone or only at the central office or can we use Warner pole-changer for ringing. Must we have different ringers than the 1,600 ohm now in use? Must we have different ringing keys at the central office switchboard? T. H. N.

It will not be necessary to change the generators or ringers of your telephones for divided circuit operation, but it will be necessary to change the wiring of the latter. This can be done by disconnecting the wire which connects one side of the ringer directly to one of the line binding posts and then connecting this side of the ringer to the middle or ground binding posts of the telephone (Fig. 683a). If there is no ground post on the telephone one can be easily added for this connection.

The instruments should be legged from each side of the line to ground, as shown in Fig. 683b, adjacent instruments being connected to opposite wires of the pair to preserve the balance.

The simplest arrangement of the wiring of the switchboard is to use a master key for switching the ringing current from the generator to the regular ringing keys, so that this current can be either projected over the tip side of line, through the ringers of the telephones, there to be connected to earth and back to generator, or over the sleeve side of line through the telephone

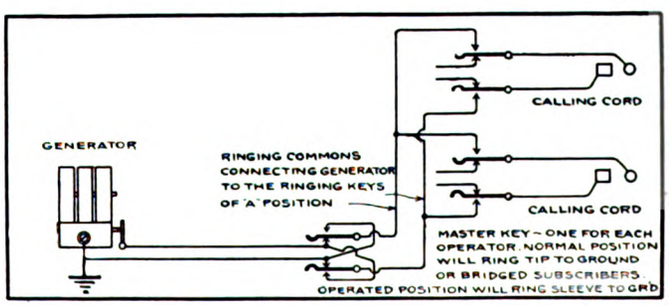

Fig. 683c.

ringers connected thereto, and also back to generator. The wiring of such a master key is shown in Fig. 683c. The trade name for such a key is "single listening key."

A Warner pole changer or other source of ringing power can be used to supply the ringing current for divided circuit use, as it only requires an alternating current to ring the bells.

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THE EDITOR'S PAGE

VOICE TRAINING.

POLITENESS of exchange employees is recognized as one of the most valuable means by which a telephone company is enabled to gain public favor. Those who come most in contact with the patrons of a system are naturally the operators, and courteous, considerate treatment of the subscriber by these employees is of maximum value.

It is true that the standards governing the method of handling calls fix the phrasing of responses, on account of the necessity for saving time by the elimination of all unnecessary words. Therefore, there can be no variety in the wording, and the standard responses are designed rather for practical time saving results than for the production of a pleasant personal impression upon the subscriber.

There is one feature in these responses which is capable of being controlled, however, and that is the inflection. Those who have observed the working of an individual operator throughout an entire day are familiar with the fact that constant reiteration of the same words tends to deaden the faculties directly engaged in the work, as indeed is the effect of constant repetition of any act. The evident result is the possibility of developing a monotonous habit of speech, in which, although the words may be clearly enunciated, there will be little life in the voice. Such a tone is one which will be far from producing a cordial response from a subscriber who is having difficulty in securing the desired connection.

The proper use of a rising inflection at the time of the original inquiry for a number is almost sure to convey an impression of personal interest to the subscriber. Another way in which the operator can assist in impressing the subscriber with the value of the service of the telephone company is in the repeating of numbers. Here the object is simply to give the subscriber a chance to challenge in case of a mistake, while the operator does not desire a response of approval in case the number is correct. It is to be presumed that in nearly all cases the operator will understand the number correctly, as it is first spoken by the subscriber, and will therefore repeat back to him the same number which he has given her. The tone which will convey the impression that the operator is sure that she has accurately obtained the call is recognized as the proper one. In a case like this there is the double advantage of a saving of time, as the subscriber is satisfied no reply is necessary, and of giving him confidence that his business will be promptly and accurately handled.

In magneto exchanges, perhaps to a much greater extent than in common battery offices, the matter of challenges upon a line deserves a great deal of attention. The operators become accustomed to cutting in on a line with a challenge, such as "Waiting." "Are you through?" etc. Frequently, they find that the persons who were using the line have left it without giving any sort of a clearing out signal. The tendency is for an operator, after having had this experience many times, to perform this operation in a perfunctory manner, and slur the phrase with which she challenges. It will be recognized at once that, in a case where she does find a subscriber on the line, such an example of careless operating is likely to produce a most unpleasant effect.

To secure the benefits which come from a careful observation of the rules which produce the desired vocal effect, a few general features beyond the mere training in the method of pronouncing phrases is necessary. The most essential of all is the requirement that no operator should be kept handling an unusually heavy load for too long a time. It is a well known fact that the tendency of an operator to raise her voice to a higher pitch when subjected to the nervous strain imposed by a too long continued rush of business is strong. It is therefore highly essential that frequent reliefs should be provided at a time when it is especially to be desired that every effort to make up for slightly slower service, caused by an unusually crowded position, should be made by the telephone company by increasing the care in the handling of each individual connection.

Every business man recognizes that in a case of active competition, such as we see being carried on between the opposing telephone interests of the country, the personal element more frequently than any other is the factor which determines success. As the exchange operators have communication with the subscribers more often than any other employees of the company, it is of the utmost importance that their relations with the subscribers, while to a large extent impersonal, should nevertheless be as cordial and agreeable as is possible. It is safe to say that, other conditions being nearly equal, the subscriber with two telephones is likely, nine times out of ten, to turn to the instrument which brings him a response from the exchange where he is assured of a correct response in a cheerful tone of voice.

AN INFLUENCE FOR PROGRESS.

MANY men who will graduate from some of our leading colleges and technical schools next June have already secured places with various departments of the larger telephone companies. The rapid expansion of the business has created on the part of these interests a demand for men in the higher branches of their work which is wholly beyond the supply. This fact has been most fully realized, and every effort is being made to secure men who, by their training, are fitted to most readily acquire the ability to deal with the technical problems which the companies will have to solve in the future.

The comparatively ready response which is being made by the students to these advances is a significant indication that the pleasant and profitable features of telephone work are becoming more thoroughly and more widely understood than formerly. Vigorous competition has caused the giving out of information to the press, where all details of telephone equipment and development were formerly kept secret. Engineers in general are coming to appreciate the fact that the laying out of a telephone system involves not only engineering skill of the highest order, but offers opportunities for investigations which are worthy of the efforts of the best trained minds.

The result is that the young men whom it is the desire of the telephone companies to interest, in order that they may be in a position to cope with the expansion which is expected to continue at a rapid rate for some time in the future, are already partially familiar with the magnitude and attractiveness of the work into which they are offered opportunities to enter. Perhaps in the future one of the chief ways in which competition will have shown its ability to aid the development of the industry will prove to have been by forcing the general features of telephone development into a prominent place before the public eye, where they shall have made the attractive nature of the work evident to the men who are especially fitted to further the rapid advancement of the art.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

COST OF REPAIRS AFTER STORM.

Will you kindly give me your opinion on the following case: The original routing of a competing company's former line was back and forth across the road. When we built our toll line we got permission to straighten it at our expense. Later the other company's employees changed a wire which went into a farm house. We originally crossed above it, but when they changed it they went over us and to a tree some 150 yards from their line. They were so close to our wires that we strung a ground wire on brackets placed on the top of the two poles adjacent to the junction. During a high wind the other company's wire was disengaged from the tree and fell over our through toll lines. The farmer into whose house the wire ran had notified the other office by telephone of the condition some months previously. Both lines are of 25 ft. poles. Are we not entitled to collect from the other office for the expense of clearing the trouble? The foreman of the other company was notified of the case before it was cleared. C. T. Co.

THE editor does not believe that you could compel the other company to pay the cost of clearing the trouble, at least upon the statement of fact contained in your question. The trouble was caused primarily by the storm and neither men nor telephone companies are held liable for the damages caused by the vicissitudes of nature. Your statement does not show that the other company was negligent in its construction or maintenance of its lines. Had the change you speak of not been made, your company's wire would have been the overrunning one and the other company might have been injured. It may be that a more thorough understanding of the case on the editor's part would lead him to a different conclusion, but upon the facts as stated, he believes your company will have to stand its loss.

CHANGE OF SERVICE AND RAISE OF RATES.

Would you kindly let me know through the columns of your paper whether or not a city council can prevent a telephone company from changing its service from a single line to a party line system when the franchise does not specify what kind of service shall be given? And also, if some subscribers still insist on single lines, could we then make them pay more for the special service? F. M.

A CITY council cannot prevent a telephone company from changing a single line system to a party line system when the franchise is silent on the subject. If the maximum rate that the company may charge is specified in the franchise, the company may not raise the rate even although an improved kind of service is given. You do not state whether the franchise prescribes the rate or not. If it does not, there is, of course, nothing to prevent you charging a higher rate for the special service. See Central Union Telephone Company v. Beadbury, 106 Ind., 5 N. E., 721. It may be, however, that the city had no right to prescribe the rates in this place, and if that is the case, you could certainly raise your rates to whatever figure the service was worth. The city's authority to fix rates, if it exists, is based upon its charter. This should be scrutinized to determine the question. See State v. Mo. & Kan. Telephone Company, 88 S. W., 41.

POWER OF PROBATE COURTS OVER FRANCHISES.

THE Queen City Telephone Company brought an action against the city of Cincinnati in the probate court, in order to obtain the right to put its wires and apparatus in conduits under the streets of the city. The petition averred that the telephone company had made application to the council of the city to prescribe the manner of use by it of the streets in constructing its lines of telephone and telegraph, and transmitting at the same time the form of an ordinance that the telephone company was willing to accept; that the committee to whom application had been referred reported that there was not room in the streets of the city for the accommodation of the lines asked for and that it was inexpedient to make any such grant. The petition prayed that the court direct in what mode the company should construct its lines along the streets of the city so as not to incommode the public in the use of the same. The case passed through the probate court, the court of common pleas, the circuit court for Hamilton County, and finally reached the Supreme Court of Ohio. In the latter tribunal it was held that the company must prove its incorporation according to law, including the due and legal election of directors, and decided that the company in this case had failed to make the proper proof. The court further held that there was no specific question of difference between the corporation and the municipal authorities. It found that no defined plan for the occupancy of the streets had been presented to the council or the probate court for its acceptance or refusal. The court finally decided that the probate court had no power to authorize or direct the construction of the conduits in subways under the streets of a city in the absence of consent by the municipal authorities. The Supreme Court, therefore, ordered the probate court to dismiss the petition of the telephone company. Queen City Telephone Company v. City of Cincinnati, 76 N. E., 392.

INTERFERENCE WITH PRIVATE DESK TELEPHONES ENJOINED.

AT Chicago Judge McEwan has granted a temporary injunction to Mason & Wyman, attorneys, with offices in the Kedzie Building, to restrain the Chicago Telephone Company from interfering with the firm's telephone service. Following the example of others, the attorneys had a private company install extension desk telephones in their offices. This, it is alleged, brought down upon them endless annoyances, the continuance of which is enjoined.

CARE CHANGES WITH CIRCUMSTANCES.

A GUY wire belonging to the Delaware and Atlantic Telephone Company broke, and falling on an electric wire belonging to another company, became charged with electricity. The broken end fell in the grass in a field across which people were accustomed to travel without objection, but without other right. The body of William G. Guinn, a lad 13 years of age, was found in contact with the guy wire, from which he had received a shock that caused his death. It did not appear that the boy had any right to be on the property. The telephone company contended that it was under no duty to the deceased because he was a trespasser, at best a mere licensee. The court held that the telephone company was under a duty to the boy to exercise care even if he was a trespasser against the land owner. "If a trespasser, his wrong would be to the land owner alone, not a public wrong, nor a wrong to the defendant." The court held further that the jury might infer negligence from the omission of a guard wire between the electric light wire and the guy wire which caused the boy's death. The telephone company contended that the danger arose after the construction of the telephone line, and was due to the running of the electric light wire below the guy wire. The court overruled this contention, laying down the rule that the care required of the telephone company changed with the changed circumstances. Guinn v. Delaware and A. Telephone Company, 62 Atl. 412.

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IN THE OPERATING FIELD

NORTH CAROLINA COMPANY GIVES OUT TIME FROM FAMOUS OLD CLOCK.

AWAY back in Colonial days a king of England presented a tower clock to the people of Hillsboro, N. C. It was installed in the tower of the court house and ever since has faithfully shown the time of day, telling the hours in the sonorous tones of its old bronze bell. Across the street, with the tower of the famous old court house in clear view, is the exchange of the Morris Telephone Company. Every day on the stroke of twelve the time is sent out to all the subscribers on the rural lines, who thus are enabled to adjust their clocks and watches to the same standard.

The Morris Telephone Company, which operates this exchange, has its head office in Roxboro, a busy little town in North Carolina. Its lines reach out into the surrounding cotton country, and a system of toll lines is under way which will ultimately reach every town in the Piedmont section of the State.

The exchange at Hillsboro was only recently opened. The switchboard is magneto and is equipped for one hundred metallic lines. The construction is of the highest grade and all circuits are metallic throughout.

The officers of the company are R. J. Teague, president; J. D. Morris, secretary and treasurer.

MEETING OF INDEPENDENT TELEPHONE MEN TO BE HELD AT MURRAY, KY.

THE West Kentucky and Tennessee Independent Telephone Association will meet at Murray, Ky., on the third Saturday in April, at 10 A. M. All Independent telephone companies are urged to send delegates, in order that they may participate in the discussion and action for the mutual benefit and protection of their interests.

Dr. A. V. McRee is president of the association, and B. B. Pullen, secretary.

APPLICATION MADE FOR A FRANCHISE IN ANACONDA.

AT a recent session of the city council of Anaconda, Mont., the application of F. H. Stow and others for an Independent franchise was taken under consideration.

The judiciary to whom the request for a franchise had been referred some weeks ago filed a lengthy report favorable to granting it, subject to a special election, when the question would be submitted to the voters of the city, upon the deposit of a certified check by the petitioners to cover the cost of the special election. The terms of the franchise were considered liberal by the judiciary committee of the council.

INDEPENDENT COMPANY IN SYRACUSE, NEW YORK, PUSHING LARGE EXTENSIONS OF ITS CONDUIT SYSTEM.

THE Independent Telephone Company of Syracuse has started work on the twelve miles of underground conduit which will be laid this season. The company is using vitrified clay, multiple duct conduit, encased entirely in concrete. The manholes will be of concrete, oval shaped, a construction which is not largely used for telephone work. The work is in charge of Chief Engineer John D. Pierce.

For aerial distribution the company is now setting poles throughout the city and stringing cables. The plant is an all-cable plant with multiple distributing boxes. No cross-arms or open wires are used within the city. A cable capacity of 3,000 pairs, entering the exchange in 300-pair cables is being installed. The underground work will require 200 men who will be kept busy all summer. Several gangs will be working at one time.

The Independent company is also building several new long distance copper toll lines. The line from Syracuse to Utica is completed and lines from Syracuse to Binghamton and Pulaski are under construction.

Exchanges are being installed in several nearby small towns and these are being connected with country lines so that Syracuse can have communication with the farmers of the vicinity.

The new switchboard at the main exchange is now in use and giving the best of satisfaction. The cut-over was made from the old exchange in nine minutes.

PURDUE STUDENTS VISIT CHICAGO.

ONE hundred and eighty members of the junior classes in mechanical, civil and electrical engineering of Purdue University at Lafayette, Ind., accompanied by several members of the faculty, recently visited Chicago to inspect the factories and power and industrial plants.

The party was in charge of Dean W. F. M. Goss, the mention of whose name is sufficient to admit a student into any manufacturing establishment in Chicago. The other professors were W. D. Pence, C. P. Matthews, L. V. Ludy, J. D. Hoffman, A. B. Smith, A. N. Topping, Albert Smith, A. M. Kenyon and E. J. Fermier. Among the students were seventy-four taking the mechanical engineering course, sixty-four the civil and forty-four the electrical.

Purdue University's department of telephone engineering, now four years old, is to be enlarged and made a more prominent factor in the curriculum of the institution. The demand for graduates in this department of the university has grown steadily and every man who will graduate this year has already found a position. The Western Electric Company has engaged fifteen telephone students and other concerns want more. The laboratory space is so limited that it has been decided to enlarge the electrical building to make more room.

GREAT AGITATION FOR MUNICIPAL TELEPHONE SYSTEMS IN CANADA.

"MUNICIPAL ownership of telephones with government control of rates" is the cry being raised from one end of the Dominion to the other, and it would appear as though the days of telephone monopoly will soon be a thing of the past. Manitoba set the example, which has been followed by the other provinces. The government of that province has appealed to the Dominion Parliament for a change in the act which incorporated the Bell Company to allow governments expropriating the company's lines. Ontario at the present time is busy collecting petitions to be presented to the local legislature praying for municipal ownership of telephones, and already several members of the government have expressed themselves as being strongly in favor of the province owning the telephone systems operated therein.

In the Province of Quebec the league of municipalities passed a resolution to be presented to the local legislature asking for control of telephone rates by the expropriation of the Bell system. The newly formed Province of Alberta is also in favor of this measure, being adopted there, and at the meeting of the Union of Alberta Municipalities held in Calgary recently some strong statements were made regarding the operations of the Bell Company and the exorbitant rates charged, it being shown that telephones could be operated at a profit at less than one-half

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FOR SALE—6-100 pair and 11-50 pair Sterling Inside Terminal Heads complete with heat coils. Used very little and good as new. Address, Macon County Telephone Co., Decatur, Ill. 580

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Ten first class cable splicers familiar with underground and aerial work. Must furnish references with application. Also two able cable foremen to supervise work of splicing gangs. Must be well recommended. Address, Box 586, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 586

WANTED—By a large telephone factory in Chicago, young men not over 22 years of age, preferably graduates of high schools or technical schools, to enter an apprenticeship course and be trained to install and operate modern central office equipment. Address, stating age, education and experience, Box 582, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 582

WANTED—Continued

WANTED—Wire chief on exchange of 700 to 1,500 magneto subscribers in Kansas. One who is also good on outside construction. Must be able to handle storage batteries, rural and toll lines. If interested, write stating salary, etc., to Box 583, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 583

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WANTED—Telephone men experienced in automatic switch work. State experience and salary expected. Address Supt. of Equipment, Home Telephone & Telegraph Co., Los Angeles, Cal. 581

WANTED—Position wanted by an all round telephone construction man who is thoroughly competent, sober and reliable. Best of references. Have completed course in telephone engineering. Address Box 587, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 587

WANTED—Reliable, ambitious young man to act as manager, troubleman and night operator in a small town. Good prospects for the future. References required as to character and capability. State salary. Year contract. Address Box 367, New Britain, Conn. 588

WANTED—Position as manager in common battery exchange by telephone man with 10 years' experience. Salary no less than $100 per month. Address Box 589, care THE AMERICAN TELEPHONE JOURNAL, 116 Nassau street, New York City. 589

WANTED—Position as traveling representative. My replies to inquiries bring orders. Introduction of new features preferred. Can also furnish system of reports relieving toll agents entirely. Address Warren E. Jaques, General Delivery, Indianapolis, Ind. 585

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the rates now charged by the company. The question of government control of telephone rates has also been brought up in British Columbia, but so far no definite steps have been taken. In a few days the Saskatchewan municipalities will hold a meeting of the municipal league when the same question will be discussed, and it goes without saying a similar resolution will be carried. It now remains for the smaller provinces—Nova Scotia, New Brunswick and Prince Edward Island—to raise the cry and government ownership of telephones from coast to coast will be an assured thing.

INDEPENDENT FRANCHISE GRANTED IN OAKLAND, CAL.

THE Home Telephone Company of Alameda County, Cal., which is backed by the same financial interests that are behind the Home Company of San Francisco, was granted a franchise in Oakland for fifty years on the following conditions:

First, the Home Company, after five years, is, according to the State law, to pay to the city two per cent. of the gross earnings.

Second, the city of Oakland is to have the free use of one conduit throughout the underground system of the Home Company and the use of all surface poles and connections.

Third, the city is have the free use of fifty telephones.

Fourth, the Home Company to expend, under a $100,000 bond, $875,000 in three years.

In addition to the foregoing conditions the Home Company promised the city to make a bid of at least $20,000 for the franchise. This is said to be the highest bid for a telephone franchise ever made in a city of equal size.

THERE'S ALWAYS A REASON.

"HERE, lad, this bill is not right," said a local alderman when presented with a bill by the youthful collector for the Union Telephone Company of Erie, Pa. "Your company has charged me 15 cents for a message to Girard and your rate ought to be 10 cents, the same as the North East rate. Why must I pay more to talk to Girard than I would to talk to North East, when the distance is the same?" The boy, ignorant of the fact that the bill included a charge for excess time, said haltingly, "I don't know—perhaps it's because Girard is up hill and North East ain't." While the explanation was not entirely satisfactory to the alderman, the charge was paid without further protest.

RALEIGH MERCHANTS' ASSOCIATION IN FAVOR OF INDEPENDENT SYSTEM.

MEMBERS of the Retail Merchants' Association of Raleigh, N. C., recently passed resolutions to exclusively employ the telephones of the Raleigh Telephone Company and to sever connections with the Bell and Interstate companies by September 1, 1906. It was further recommended that the members use their influence with the residents of the city to get them to adopt the Independent system. The Interstate company started business about ten years ago. It sold out two of its exchanges to the Bell about two years ago and it is generally believed that its Raleigh exchange is affiliated with the Bell interests. The Raleigh company is prepared to spend $30,000 on improvements and will do everything in its power to furnish the city with the best service possible.

INDEPENDENTS CUT LOOSE AT SPENCER, INDIANA. AN EARLY BLOSSOM GETS CAUGHT BY THE FROST.

THE following from the February issue of the Central Union News indicates that the heavy snow storms and continued cold weather in March caused havoc not only with the *crocus* and other early spring flowers, but even the *bluebell* got severely nipped by an unexpected Independent cold wave.

"About 2,000 new connections where a year ago the Central Union had sixteen telephones is the way the wilderness is being made to blossom in Western Indiana. A deal has been perfected by which the Central Union secures connection with the Mugg system operating Independent telephones in and around Spencer, Owen County."

As soon as it was definitely established that the Central Union had purchased a majority of the stock and all of the junk of the Mugg Telephone Company, all the Independent telephone companies promptly cut loose.

These included the New Long Distance, the New Home Telephone Company, of Bloomfield; the Bloomington Home, the Farmers' Mutual of Spencer, the Patricksburg system, the Farmers' system at Gosport and the Stinesville system. Also the former Mugg subscribers in Spencer began ordering out the telephones as soon as the Bell doubled the rates, and ordering telephones from the Farmers' Mutual Telephone system, which now has 250 subscribers with a list that is rapidly increasing. All of these companies have entered into contracts with the New Long Distance, which has just completed the installation of a switchboard in Spencer of the latest type, with trunk lines connecting with the other Independent companies in Spencer and Owen counties.

It is predicted that within a short time the Bell will have only a toll station left in Spencer.

Moral: The wilderness should not go into the blossoming business until all danger of cold waves is past.

INDEPENDENT COMPANY AT NIAGARA FALLS ENABLES HOSPITAL PATIENTS TO HEAR SOUSA'S BAND.

NIAGARA FALLS is a city in which the transmission of electricity in all forms and for innumerable purposes is so common that it takes something extraordinary to make any impression upon its people. Nevertheless electricity was recently put to a use which was decidedly novel to that city on the occasion of the visit of Sousa's Band to the International Theatre.

General Manager R. M. Eaton, of the Niagara County Home Telephone Company, decided to put the facilities offered by the Independent telephone system at the disposal of the patients in the hospital, to enable them to hear this concert. With this in view, he secured a special transmitter, which he placed upon the stage and connected directly with the hospital. In order to give this service considerable special wiring had to be done, but by the time the concert was opened Mr. Eaton had a telephone within reach of every patient. Much favorable comment was aroused by this additional evidence of alertness in seeking opportunities to increase the value of its service on the part of the management of the Independent company.

FIFTH DISTRICT OF ILLINOIS INDEPENDENT TELEPHONE ASSOCIATION TO HOLD MEETING.

INDEPENDENT telephone men forming the fifth district of the Illinois Telephone Association will meet in Peoria on April 15, 16 to discuss and devise ways and means for the furtherance of the interests of the Independent telephone exchanges. The Peoria meeting is expected to be the largest ever held in the State, as during the past year the Independent telephone movement has assumed large proportions, and much time and effort have been expended to bring the owners and operators together on a sound working basis. E. R. Conklin, secretary and general manager of the Independent Telephone and Telegraph Company, is president of the organization.

One of the objects of the meeting is to consider means for protecting the smaller Independent companies from the Bell Company. The toll rate question will be threshed out, and the movement for a telephone clearing house started at the meeting held during last January will be further considered. The committee, composed of J. W. Barrett of Pekin, Sid Dailey of Chillicothe and C. A. Camp of Sparland, will submit a report to the meeting, which will be thoroughly discussed and if not adopted will form a basis for further consideration by the members.

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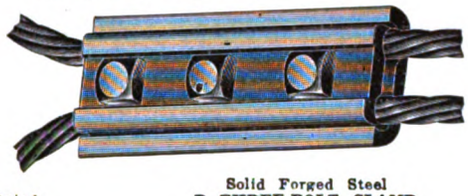

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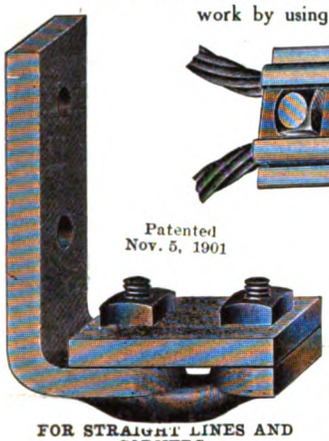

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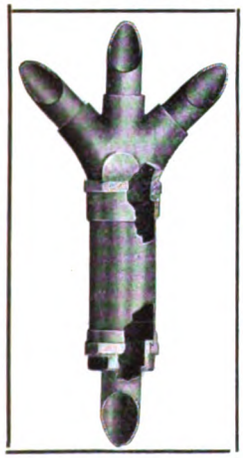

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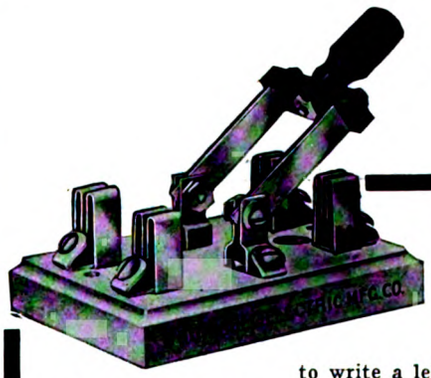

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is the best on the market, you will receive ample and convincing proof, and incidentally learn a good deal about switches which will be of value to you. There were several good reasons for the design of this switch which, you will notice from an examination of the illustration, differs from any other you ever saw.

Its most salient feature is the U-shaped terminal clip. This novel construction makes faulty contacts impossible; it preserves the surface of the blades by distributing the tension between the two clips, neutralizes any strain upon the parts due to an uneven base, and its adjustment is permanent.

These facts surely must appeal to you if you have ever had anything to do with the ordinary switch. Let us quote you prices and send you particulars regarding their use in connection with telephone systems.

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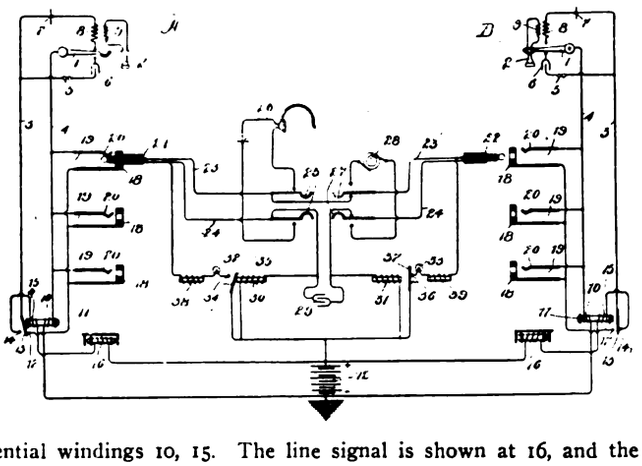
TELEPHONE PATENTS

TELEPHONE EXCHANGE SYSTEM.

Harry G. Webster, Chicago, Ill., patents (No. 816,052; dated March 27, 1906; filed December 3, 1903; serial No. 183,655) and assigns to the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., a telephone exchange system.

This patent relates to common battery circuits in which only two contact jacks and plugs are employed and discloses means whereby the supervisory signal of each half of a cord circuit may be operated in conjunction with one relay instead of requiring two as heretofore. At the same time, the inductive balance of the circuit is maintained.

Referring to the illustration, 11 is a cut-off relay having differ-



ential windings 10, 15. The line signal is shown at 16, and the supervisory signals at 32, 33, in series with impedance coils 38, 39, respectively. Supervisory relays 30, 31, are provided with circuit closing armature contacts 35, 37.

The circuit operation is as follows: When *A* removes his receiver from the hook a circuit is completed through the closed contacts 14, 13, differential windings of the cut-off relay, line signal 16, and battery 12, thereby displaying the line signal. The operator then inserts plug 21 in the answering jack, which results in the closing of a circuit from the positive side of the battery, armature contacts 35, 34, supervisory lamp 32, impedance coil 38, tip of plug 28, tip of jack 20, through winding 10 of relay 11 to battery. At the same time a circuit is completed from battery through winding of supervisory relay, sleeve contacts of jack and plug, contact 17, armature 13, line 3, substation set, back to battery through winding 10 of cut-off relay.

The circuit through the supervistory relay is only momentary, due to the fact that the differential windings of the relay 11 are unbalanced by the shunt path for the current flowing through the winding 10, formed by the supervisory lamp circuit. This causes the relay 11 to attract its armature 15, which closes with contact 17, opening the line signal circuit and completing the circuit for the supervisory relay as mentioned heretofore.

After ascertaining the number desired, the operator plugs in to the multiple of the line called. A circuit is then formed from battery through supervisory lamp 33, impedance 39, tips of plug and jack, winding 10 of cut-off relay back to battery. This causes the armature of the cut-off relay to be attracted, opening the line signal circuit and the supervisory signal is illuminated. The balance of the circuit is maintained by means of the impedance coil 39.

When the subscriber answers, a circuit is completed through the supervisory relay, sleeve of cords and jack, contacts 17, 13, line 3, substation *B*, winding 10 of cut-off relay 11, battery, thereby opening the supervisory lamp circuit. When the parties hang up, the sleeve circuit is opened and the supervisory lamps are relighted.

TELEPHONE SYSTEM.

William M. Marean, Belvidere, Ill., patents (No. 814,386; dated March 6, 1906; filed June 6, 1904; serial No. 211,263) a telephone system.

In this patent means are disclosed which enable the subscriber to indicate visually instead of orally the telephone number of the line with which he desires to connect his instrument. Step by step mechanism controlled by special apparatus at the subscriber's instrument is employed to operate indicators at the exchange to accomplish this result.

TELEPHONE TRANSMITTER.

Michael Setter, Chicago, Ill., patents (No. 811,098; dated Jan. 30, 1906; filed Dec. 30, 1904; serial No. 238,902) and assigns to the American Electric Telephone Company, Chicago, Ill., a telephone transmitter.

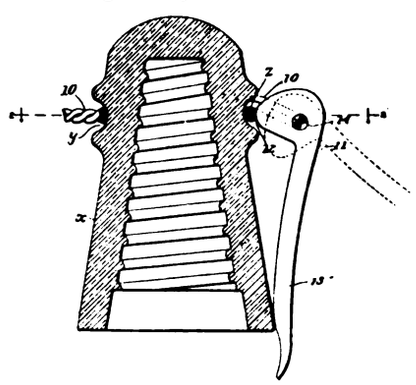
In this invention means are disclosed whereby the front plate is formed out of two metal stampings, held together by reaming the edge of one over the edge of the other. Thus great economy in manufacture is secured as the only machine work required to finish the part is the tapping of the front member of the combination to engage the threads of the mouthpiece.

INSULATOR ATTACHMENT.

Hans Swanson, Warren, Minn., patents (No. 814,887; dated March 13, 1906; filed April 26, 1905; serial No. 257,516) an insulator attachment.

The object of this invention is to provide a means whereby a wire can be readily attached to an insulator and when desired as easily removed.

Referring to the illustrations, *x* is an insulator of the usual type provided with a groove *y* to receive the tie wire, which is



formed into a loop 10 and passes through a cam lever 11, forming a fulcrum therefore. The lever has a cam-shaped nose 12 which engages with the line wire *z*.

In operation the loop is threaded through the lever and passed over the insulator. Then the line wire is placed in position in the groove and the lever handle 13 depressed. This action causes the nose 12 to press the line wire *z* tightly against the insulator, thereby locking both in position, with the line wire pulled taut.

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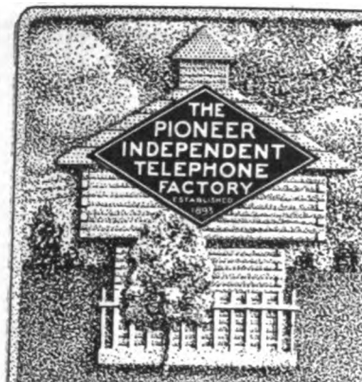

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SWITCHBOARDS
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TELEPHONES
BOTH MAGNETO AND CENTRAL ENERGY

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all of our instruments proclaim

Quality, Efficiency, Durability

We guarantee every one of them and every part

Type "P" Ringing and Listening Key is mechanically and electrically as near perfect as it is possible to make it. It has only four (4) wearing parts, and will last for years. When necessary to replace wearing parts, a screw driver and a pair of pliers are all that are needed. No disconnecting necessary.

Frame is a solid piece with nickel-plated top and a lever with black or red rubber handle. Springs are all German silver of the right length and thickness to secure the best effects with pure hard rubber as an insulation. The key has a good action. Contact points are all pure platinum.

A postal will bring illustrations, samples and prices.

Western Telephone Manufacturing Co.
PIONEER INDEPENDENT TELEPHONE FACTORY
Established 1893 No. 58 West Jackson Blvd., Chicago

A Valuable Bi-Product

Why not go after intercommunicating business? There isn't a factory in the country that doesn't need it. We manufacture systems to meet all requirements and arrange them with a trunk button for connection to your exchange. They are cheaper and more practical than branch exchanges and furnish better service.

Trunk Button

Send for Catalogues

STANDARD SIZES:

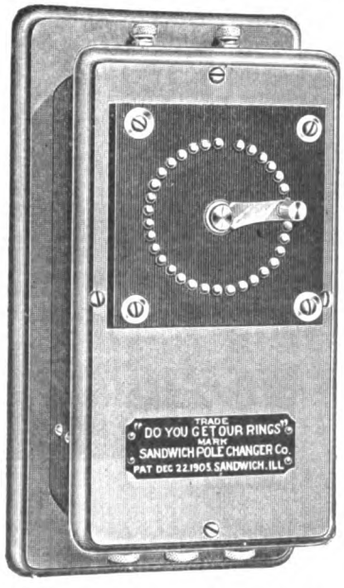
8	Intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers
162 PEARL STREET, BOSTON, MASS.

TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company
400 Eddy Street, Sandwich, Ills.

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IN THE MANUFACTURING FIELD

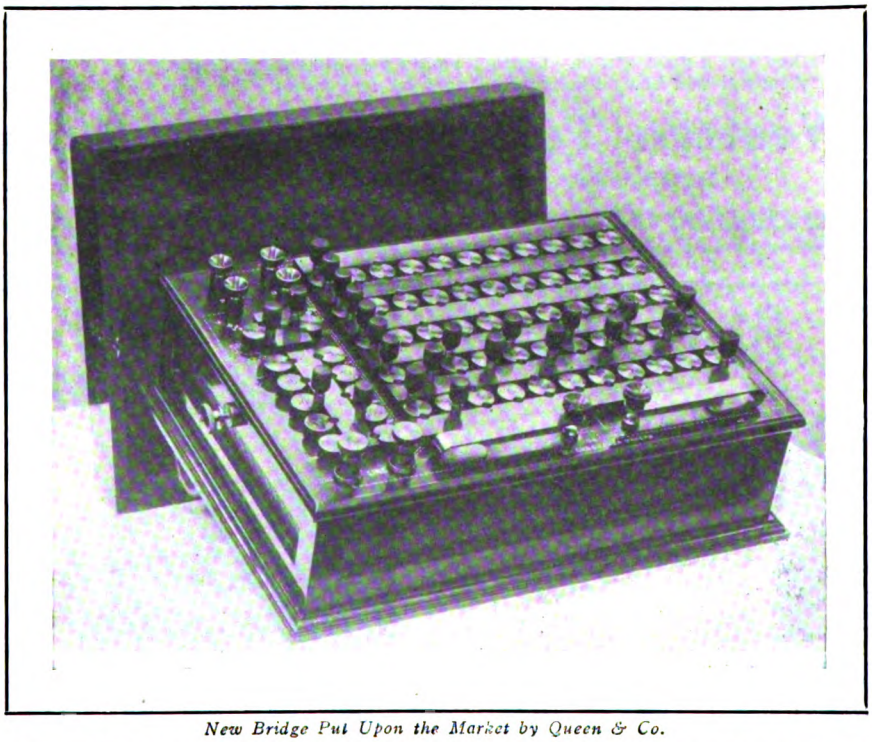
"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

AN ACCURATE, BUT INEXPENSIVE BRIDGE.

A NEW Universal Decade Box and Wheatstone Bridge with several novel and attractive features has recently been brought out by Queen & Co., of Philadelphia. It is in arrangement very similar to the well known Anthony form, but considerably smaller in size.

The rheostat proper consists of fifty coils, ten each of tenths, units, tens, hundreds and thousands, and so arranged that all the coils in any bank can be connected in series, multiple, or various combinations of the two. This arrangement lends itself particularly well to the thorough and complete interchecking of the coils; as, for instance, the ten 100 ohm coils can be connected in multiple and compared with each 10 ohm coil, which latter in turn can be compared with the ten 1 ohm coils connected in series; likewise, this interchecking can be extended to the other coils in the rheostat.

The bridge consists of a unit, ten, hundred, thousand and ten thousand ohm coil in each arm, which latter, by means of a commutator, can be reversed and their equality determined to a nicety.



New Bridge Put Upon the Market by Queen & Co.

Battery, galvanometer and line posts are provided and in the galvanometer and battery keys special care has been taken to use a gauge of metal which will not tire the operator and which will yet allow perfect electrical contact to be made.

The connections are engraved in dotted lines on the hard rubber top, the double line indicating the heavy interior of connections and the single lines showing the galvanometer and battery circuits.

The lower edges of the metal blocks and bars facing each other are beveled slightly, and owing to the circular form of metal block, much greater insulating space is secured than with the older form of rectangular block.

The coils are wound with manganin wire thoroughly shellacked, aged and baked. The accuracy of adjustment of the bridge coils is 1-50 of one per cent, that of the thousand, hundreds and tens in the rheostat, 1-25, the units 1-10, and the tenths, 1-5 per cent, respectively, of their stamped values.

The perforated metallic sides allow a free circulation of air, which together with the zero temperature coefficient quality of the special wire which is used, make the box practically independent of temperature variations.

If requested, a table of readings accurate to 1-50 of one per cent will be supplied with each set, showing the actual measured resistance of each coil. Twenty-four plugs and two travellers are supplied. When not in use, a polished hardwood mahogany cover, similar to the box itself, fits over the hard rubber top and plugs, effectually protecting them from dirt and the action of the light.

This set will be found to be of great value in the ordinary laboratory when accurate measurements are necessary, and yet the expense of one of the large Anthony bridges would not be justified.

THE SPARTAN CROSSARMS, PIN AND BRACKET COMPANY, of Spartanburg, S. C., has been organized with $10,000 capital stock by D. L. Wray, W. J. Gilmore, J. A. Mullinax, J. G. Houser and associates to manufacture crossarms, pins and brackets for telephone and telegraph poles.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has recently issued bulletin No. 15 superseding bulletin No. 5. In it are described the various pieces of apparatus associated with central energy telephones, besides the complete instruments. Since the former bulletin was issued numerous improvements have been made in the various parts which are fully described in this issue. Amongst these are a new transmitter, a new desk set, a new hotel instrument in an enamelled steel box, and a new hand set in which the switch is operated by pressing the receiver against the ear.

In the portion of the booklet devoted to parts of instruments very minute descriptions accompanied by exceptionally well chosen illustrations are given of each individual piece of mechanism. In the latter portion of the bulletin there are several full page illustrations of a few of the most notable Stromberg-Carlson central energy switchboards. This bulletin is well in keeping with the other numbers issued by the company and should be secured by all parties interested in high grade telephone equipment.

THE WIRE AND TELEPHONE COMPANY OF AMERICA, Rome, N. Y., has prepared a folder showing the various monthly prices of copper since July, 1883. As an index to the growth of the copper industry this little pamphlet will be found of great interest. The fluctuations indicate very clearly the business conditions existing at different periods and give an insight into the extent of production. The back cover of the leaflet draws attention to the business of the company in the way of manufactured wire and telephone products and also to its engineering department. This part of the business attends to all details relative to telephone manufacturing, consulting and contracting. The company is prepared to estimate upon any class of equipment whether interior or exterior.

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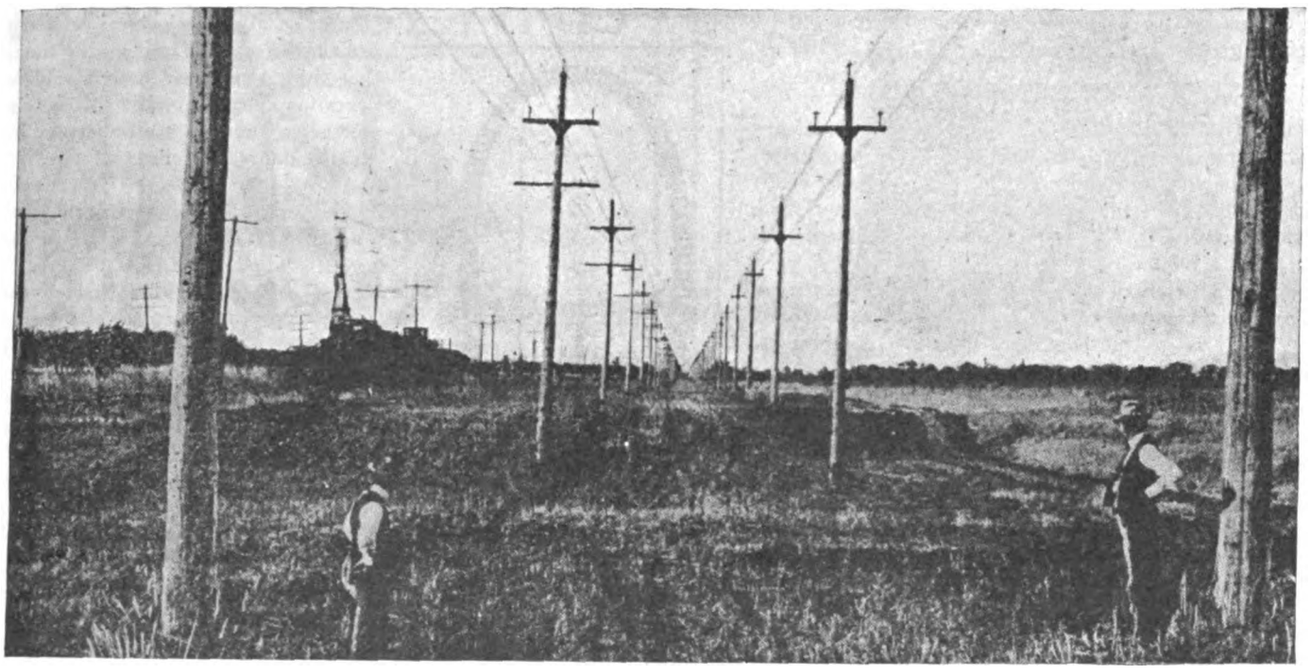
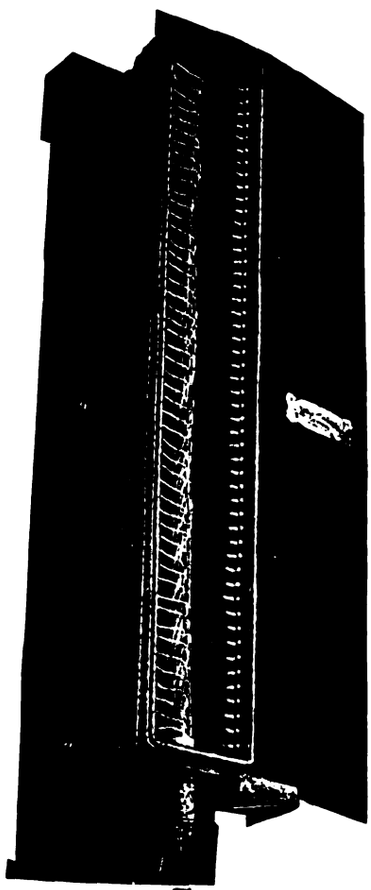
Photograph showing 142 Mile Electric Power Transmission Line of the Bay Counties Power Co., San Francisco. The poles are red cedar, 35 ft., 14 in. butts, 8 inch tops, set one-sixth of their length in the ground. The lower end from above the ground line is painted with

Avenarius Carbolineum Wood Preservative to Prevent Decay



WRITE FOR BOOKLETS GIVING FULL INFORMATION

CARBOLINEUM WOOD PRESERVING CO., 126 Reed St., Milwaukee, Wis.



Cable Terminals by the Pound

The weight of our "Becker" Terminal is one-half that of any other, for we use $\frac{1}{8}$ inch pressed steel instead of cast iron. The saving in freight alone is quite an item, not to mention the ease with which the "Becker" can be put into place.

Pressed Steel "Becker" Terminals are water and air tight; furnished with self-soldering nozzle and fuses (plain if desired); have plenty of room for connections; have German silver fuse clips; have hard rubber insulation. Cable soldered to clip terminals; no loose contacts.

They last longer, look better, cause no trouble, cost less.

25 pair, wt. 20 lbs., price	fused, $12.50	plain, $10.00
50 pair, wt. 30 lbs., price	fused, 22.00	plain, 18.00
100 pair, wt. 50 lbs., price	fused, 40.00	plain, 32.00

Covers $2.00, $2.50 and $3.50

CENTRAL TELEPHONE & ELECTRIC CO.

2133-35-37 LUCAS AVENUE ST. LOUIS, U. S. A.

Makers of HIGH GRADE TELEPHONE EQUIPMENT

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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Interested parties are requested to send for this pamphlet, and, if in the market for wire or telephones, estimates will be cheerfully given.

STEEL SWITCHBOARD CORDS.

SWITCHBOARD cords which secure all the advantages from durability which accompany the steel strand type, with the additional feature of high conductivity which was formerly possessed only by the tinsel conductor cord, are manufactured by the Premier Electric Company, 118 West Jackson Boulevard, Chicago, Ill.

The two illustrations upon this page show the general design and arrangement of the parts in the Premier "B B" cord. Fig. 1 shows the cord with the outer covering removed. It will be seen that the two strands are wound in a spiral, in such a manner as to give a smooth and cylindrical surface, upon which is laid the braided cover. The small figure designated by the letter B in the centre of this illustration represents a very tough and flexible steel spring, insulated with waxed silk. This spring is inserted in the hollow center of the conductor spiral at the plug end of the cord, before the outer linen braid is put on. This braid serves to hold the spring firmly in position. The object of this arrangement is to prevent the conductor convolutions from being thrown out of alignment at a point where the cord is most sharply bent, and is naturally subject to the most wear.

In Fig. 2 one end of the cord is shown, giving a very clear idea of the appearance of the two spirally wound conductors, and the braided cover. The method in which the steel music wire strands are wound with fine copper tinsel strands, to increase the conductivity, is also made clearly evident. The outside braid of the cord is made from a very high grade waxed linen thread, which is designed to become smooth with a little wear, making the cord run easily.

These cords are made in three colors. gray, brown and red, and trimmed to fit any plug. The company furnishes them of any length, and with any number of conductors required, upon receipt of specifications. Further information may be obtained from the manufacturers.

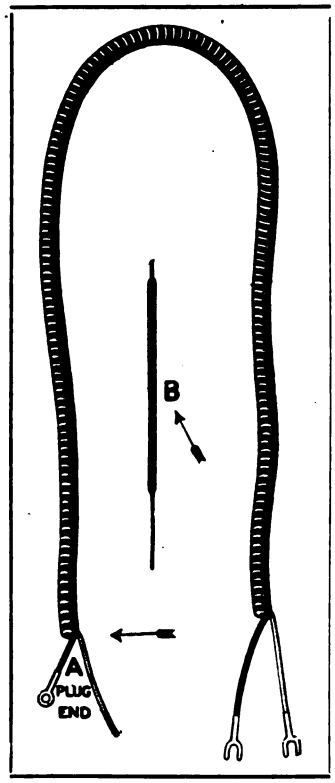

Fig. 1. Premier switchboard cord with braid removed, showing tight spiral arrangement of conductors.

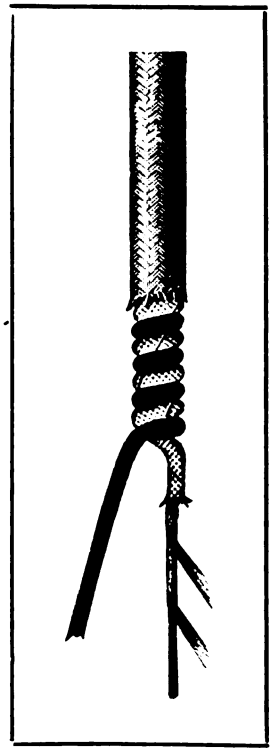

Fig. 2. Dissected end of Premier B B cord.

WILLIAM J. MURDOCK & Co., Chelsea, Mass., are issuing a little booklet describing the "Solid" type receivers it manufactures. These receivers receive their name from the fact that the magnets and terminals are moulded in a solid composition case. Three types of hand receivers are shown, besides a watch case instrument. The manufacturers claim that the adjustment of the parts is permanent, that the case will not break, and that the instrument is correctly designed from both electrical and mechanical standpoints. To all parties interested the catalogue will be mailed upon receipt of a request for the new "Booklet C."

THE ELECTRIC GOODS MANUFACTURING COMPANY, Boston, Mass., is placing on the market a combined telephone and fire alarm system known as the "Safeguard." It is devised to automatically notify the hotel clerk of a fire in a room, and, if deemed advisable, a single plug can be withdrawn which closes the ringing circuits of all the telephone bells and fire alarm gongs. The company states that this system has been placed in operation in a number of hotels. Further particulars can be secured by writing the manufacturers.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, Mo., has issued the twelfth number of the "Everbest" Magazine. It contains besides the usual short items of interest, one of which is a very well put and amusing anecdote, an article dealing with the equipment and maintenance of small exchanges. The writer cites several incidents to show the lax state of affairs frequently met with and gives some pointers of value to those who are not expert in the business. The eighth article upon the manufacture of incandescent lamps deals with the physics of a lamp and cites reasons for loss of candle power. Parties desiring to secure copies of this number and future editions are requested to send their names to the company.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, Ill., has prepared a folder which it is distributing to operating companies, in which the argument so long employed by the Bell, that two telephone systems are a nuisance, is very ably contested. Copies of this interesting paper will be forwarded to managers who send their names to the company.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, St. Louis, Mo., has issued the April edition of its monthly pictorial post card calendar. The illustration shows an attractive damsel in the act of using a Central Company's telephone. This series of calendar post cards will continue throughout the year and anyone who wishes to secure future numbers should send his address to the company.

THE WESCO SUPPLY COMPANY, St. Louis, Mo., has inaugurated a new department in its monthly magazine, "The Live Wire." Starting with the March issue, a comprehensive price list of almost every item of material used in the maintenance of the wire and substation plant of a telephone exchange will be given. The company states that the quotations are not guaranteed, but are given as the market values at the time of going to press.

This addition to the contents of "The Live Wire" makes that publication of special interest to buyers, since it will furnish from month to month a good general idea of the market conditions. Copies can be secured by addressing the company.

THE STANDARD UNDERGROUND CABLE COMPANY announces the opening of a new office for the convenience of its Southern friends in Suite 1323, Candler Building, Atlanta, Ga. Mr. C. A. Brown will represent the company at this office, and will be glad to give his personal attention to any correspondence with which he may be favored by customers or other inquirers.

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WHY

Do All the Leading Telephone Manufacturers and Telephone Companies use

ROCK ISLAND

R·I BAT

DRY CELLS?

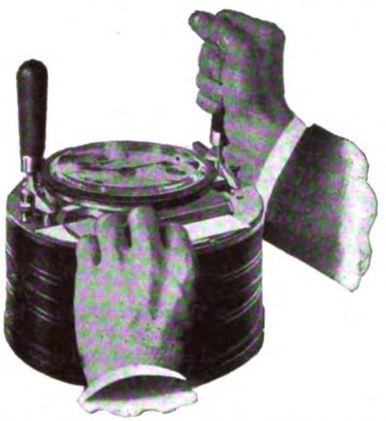
BECAUSE

Every Test they have made has proven them fully 25 per cent. better than any battery they ever used.

Order a sample barrel and convince yourself.

ROCK ISLAND BATTERY CO.
CINCINNATI, OHIO

Do Not Watch the Time Fly
Use a CALCULAGRAPH



The efficiency of your toll service depends largely upon the speed at which the operators can make connections and clear the circuits. If you burden them with the work of computing the elapsed time of a call, one of two things will happen: Either the operator will underestimate the time or subscribers will have to wait. Whichever happens, you lose.

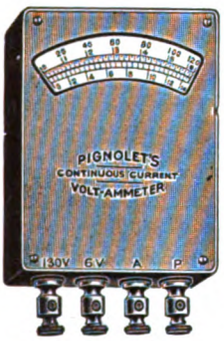
The Calculagraph computes the elapsed time without any aid from the operator, except the movement of the registering handles, and therefore relieves the service of a very serious drag.

IT MAKES NO CLERICAL ERRORS

Write for booklet and sample time tickets.

***The* CALCULAGRAPH CO.**
1437 Jewelers Building, NEW YORK, N. Y.

CHEAP VS. EFFICIENT SERVICE



The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

Insulated Electrical Wires and Cables

ROEBLING

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

Agencies and Branches

NEW YORK **CHICAGO** **CLEVELAND**
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THE WEEK'S MESSAGES

FINANCIAL.

SHELBYVILLE, ILL.—The Rose Township Mutual Telephone Company, Shelbyville, has increased its capital stock from $1,020 to $2,040.

TAMARO, ILL.—The Tri-County Telephone Company has increased its capital stock from $25,000 to $50,000.

ATLANTA, MICH.—The Montmorency County Telephone Company has increased its capital stock to $2,500.

HILTON, N. Y.—The Hilton Telephone Company has declared a six per cent semi-annual dividend.

COLUMBUS, O.—The Columbus Citizens' Telephone Company has declared its regular quarterly dividend of 1½ per cent.

COVINGTON, O.—The Covington Home Telephone Company has increased its capital stock from $23,000 to $71,000.

FRANCHISES.

OAKLAND CITY, IND.—A franchise has been granted to C. F. Stevens, representing a new company, to build and operate a telephone system in Oakland City.

RIPPLE, MINN.—Charles Swedback has been granted a franchise for a telephone exchange at Ripple.

GLOVERSVILLE, N. Y.—The Independent Telephone Company, of Johnstown, N. Y., has applied for a franchise at Gloversville.

HERKIMER, N. Y.—The Independent Union Telephone Company has applied for a franchise at Herkimer.

DELPHOS, O.—A number of citizens of Delphos have applied for a franchise to construct and operate a telephone system at Delphos, under the name of the Farmers' Mutual Telephone Company.

PROVO, UTAH.—The Independent Telephone Company has been granted a franchise to construct a telephone line from Provo to Olmsted.

CABOT, VT.—The Union Telephone Company has applied for a franchise at Barre. The company expects to run a line from Barre to Cabot, with its principal offices in Cabot.

LAKE VIEW, WASH.—The Lake View Telephone Company has applied for a franchise to construct lines throughout the county.

COMBINATIONS.

WILMINGTON, DEL.—The Delaware Telephone Company and the Wilmington Electric Light and Power Company have consolidated. The new company will be known as the Wilmington Light, Power & Telephone Company. It will have a capital stock of $1,250,000.

BROOK, IND.—The Mutual Telephone Company has acquired the Brook Telephone Exchange.

NEW WILMINGTON, PA.—The New Wilmington Telephone Company has purchased the old Western Union Telegraph line to Fayetteville, and will use it for a telephone system, establishing an exchange at Fayetteville.

EAU CLAIRE, WIS.—The Shaw Telephone Company has passed into the control of Charles Seguin, who will operate the company in the future.

ELECTIONS.

BROOK, IND.—The Mutual Telephone Company has elected the following directors: J. B. Lyons, T. L. Davis, J. A. Sell, John Sage and Bert Galbraith.

MANSON, IND.—The Manson Telephone Company has elected the following directors: M. Anderson, Russel Hallen, F. E. Bailey, T. Cheney, Thos. Major, A. Carter, J. Custic, Wilbur Curtis, James Nagle.

WENATCHEE, WASH.—The Farmers' Telephone & Telegraph Company has elected the following officers: Z. A. Lanham, president; S. W. Phillips, vice-president; Arthur Gunn, treasurer; H. C. Littlefield, secretary.

MEDICINE HAT, ALBERTA, CAN.—The Alberta Southeastern Telephone Company, Ltd., has elected the following directors: John Huston, Medicine Hat; William Rutherford, Strathmartin; S. T. Fawcett, Elkwater; W. C. Harris, Medicine Hat; F. L. Crawford, Medicine Hat; H. E. Bennetts, Medicine Hat; G. H. Smibert, Elkwater.

NEW COMPANIES.

SUCCESS, ARK.—The Citizens' Telephone Company has been incorporated with a capital stock of $20,000.

BERTHOUD, COLO.—An Independent Telephone Company has been formed at Berthoud with the following officers: C. H. Ramsay, Dr. Bennett, Samuel Southard and others. The company will install an exchange at Berthoud, and cover northern Colorado with independent lines.

CAPRON, ILL.—The Capron Home Telephone Company, Capron, Ill., has been incorporated with a capital stock of $800. Incorporators are F. D. Cornwall, E. W. Dimond and Geo. H. Olsen.

FAIRBURY, ILL.—The Fairbury Telephone Company, Fairbury, Ill., has filed articles of incorporation. Its capital stock is $20,000. The organizers are Geo. C. Monk, of Chicago, C. E. Monk and E. A. Agard, of Fairbury.

MATTOON, ILL.—The merger of the Mattoon Telephone Company with the Coles County Telephone Company and the Charleston Telephone Company consolidates the telephone systems of this region into a single corporation, the Coles County Telephone and Telegraph Company, which has sufficient financial resources for a most satisfactory extension of the service.

BLOOMINGTON, IND.—The Home Telephone Company is preparing to enlarge its local plant

GOSHEN, IND.—The Home Telephone Company, which has recently completed a line from Goshen to Dunlaps, is to build a line to Elkhart.

EAST ENTERPRISE, IND.—The Farmers' Mutual Telephone Exchange Company has been incorporated with a capital stock of $1,000. The company will build and operate a telephone system in East Enterprise, and throughout Switzerland and Ohio counties. Directors: Harvey Sedand, Henry Kuhlman and Wilson Oaks.

WAVELAND, IND.—A. P. Hanna, Charles Patton and others have organized a new telephone system to estalish and operate a telephone system in Waveland.

MEDERVILLE, IA.—The Mederville Telephone Company has been organized at Mederville with Theo. Koester as president, and W. E. Carpenter as secretary and treasurer. The company will build a line from Mederville to Strawberry Point.

LAFONTAINE, KAS.—The Wilson County Consolidated Telephone Company has been organized, and has taken over the Wilson Company and the Lafontaine Telephone Company. The company will extend its system to many other points.

LUCERNE, KAS.—The Farmers' Mutual Telephone Company, of Lucerne, has been incorporated with a capital stock of $2,000.

MEDICINE LODGE, KAS.—The Medicine Lodge Telephone Company, Medicine Lodge, has been incorporated with a capital stock of $15,000.

SAINT JOHN, KAS.—The Douglas Township Telephone Company, St. John, has been incorporated with a capital stock of $1,280.

AUDUBON, MINN.—The Audubon Telephone Company, Audubon, has been incorporated with a capital stock of $15,000. The incorporators are C. R. Billings, John P. Boyer, Albert Carlson, L. S. Cravath, C. Glaum, F. E. Gunderson, E. O. Hanson, A. O. Netland and others of Audubon.

HAWK CREEK, MINN.—The Hawk Creek Rural Telephone Company, Hawk Creek, has been incorporated with a capital stock of $25,000. Incorporators are P. E. Symes, G. P. Mangarud, E. O. Oppegaard, Steve Odegard, O. M. Agre.

HERMAN, MINN.—The Herman Telephone Company, Herman, has been incorporated with a capital stock of $50,000. Incorporators are C. J. Bacon, H. A. Hanson, G. F. Houston, J. D. Houston, A. W. Wells, J. F. Lenden, K. C. Helgeson, E. E. Peck, of Herman.

MINNEOTA, MINN.—The Minneota Telephone Company has been organized with a capital stock of $5,000. The officers are: President, G. B. Bjornson; secretary, F. C. Murray; treasurer, H. J. Tillemans.

RUTHTON, MINN.—The Current Lake Co-operative Telephone Company has been incorporated with a capital stock of $10,000.

DOUGLAS, NEB.—The Solon Telephone Company, with its principal office at Douglas, has been incorporated with a capital stock of $25,000. The incorporators are Geo. B. Hendricks, A. M. Malone and others.

ORD, NEB.—The Independent Telephone Company of Ord has been incorporated with a capital stock of $80,000. Fred J. Bell is president and Rudolph Sorensen secretary.

CENTERVILLE STATION, N. Y.—The Neversink Telephone Company, of Centerville Station, has been incorporated with a capital stock of $7,000. The directors are L. V. Gardner, E. W. Winne and T. H. Wilson, of Centerville.

HANNIBAL, N. Y.—The Bethel Telephone Company, of Hannibal, has been incorporated with a capital stock of $2,000. Incorporators are L. D. Harman, L. J. Sweet and H. W. Robinson, all of Martville, N. Y., and others.

LYCOMING, N. Y.—The Lycoming and New Haven Telephone Company, Lycoming, has been incorporated with a capital stock of $400. Incorporators are D. D. Lawton and D. H. Howard, Lycoming, N. Y.; C. A. May, Oswego, N. Y., and others.

NASSAU, N. Y.—The Rural Home Telephone Company, with offices at Nassau, has been incorporated with a capital stock of $50,000. The directors are I. R. Coughry, E. M. Woodard, P. J. Callan, George Fleming, W. B. Harris, J. E. Carhart, R. I. Hopwood, Albany.

PENN YAN, N. Y.—The Yates County Telephone and Telegraph Company, Penn Yan, has been incorporated with a capital stock of $5,000. Incorporators are Frank E. Spencer, Benton, N. Y.; Fred Culver and M. L. Spooner, Penn Yan, N. Y., and others.

TRUXTON, N. Y.—The Truxton & Cuyler Telephone Company has been

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The New Leeds & Northrup Factory

THE rapid growth of the Leeds & Northrup Co., of Philadelphia, is indicated by the accompanying illustrations, which show the new quarters recently occupied by this firm. The building was designed and built to meet the special requirements of constructing and adjusting electrical measuring instruments. It has embodied in it many features of interest. The location at 4901 Stenton Avenue is away from the thickly settled part of the city and has, therefore, all the advantages of ample light and freedom from dust. In selecting the site for location, a lot of sufficient size to allow for future expansion was acquired.

The main structure is 110 feet x 52 feet, three stories in height, fireproof in construction throughout and has all provision for the comforts of the employees.

The laboratory occupies 85 feet of the third floor, and by means of skylights, in addition to numerous side windows, an abundant supply of light, so essential for work of precision, is furnished. The illustration shows the north side, which is practically a duplicate of the south side. Careful study has been given to the arrangement, distribution and insulation of the circuits for use in current, potential and general testing work. This current is furnished by a large battery of storage cells, the terminals of which are connected to a specially constructed mercury switchboard. This switchboard permits grouping the cells in any desired combination for any particular circuit. The battery room is shown at the end of the laboratory, on the right, with the charging panel outside. The mercury switchboard is not visible. All calibrating and standardizing apparatus is permanently set up in circuit with galvanometers best adapted for the demands to be made upon them. It will be noted from the illustration that the Type H Galvanometer is extensively used.

In conjunction with the laboratory, but in a separate building, provision has been made for work in high temperature measurement.

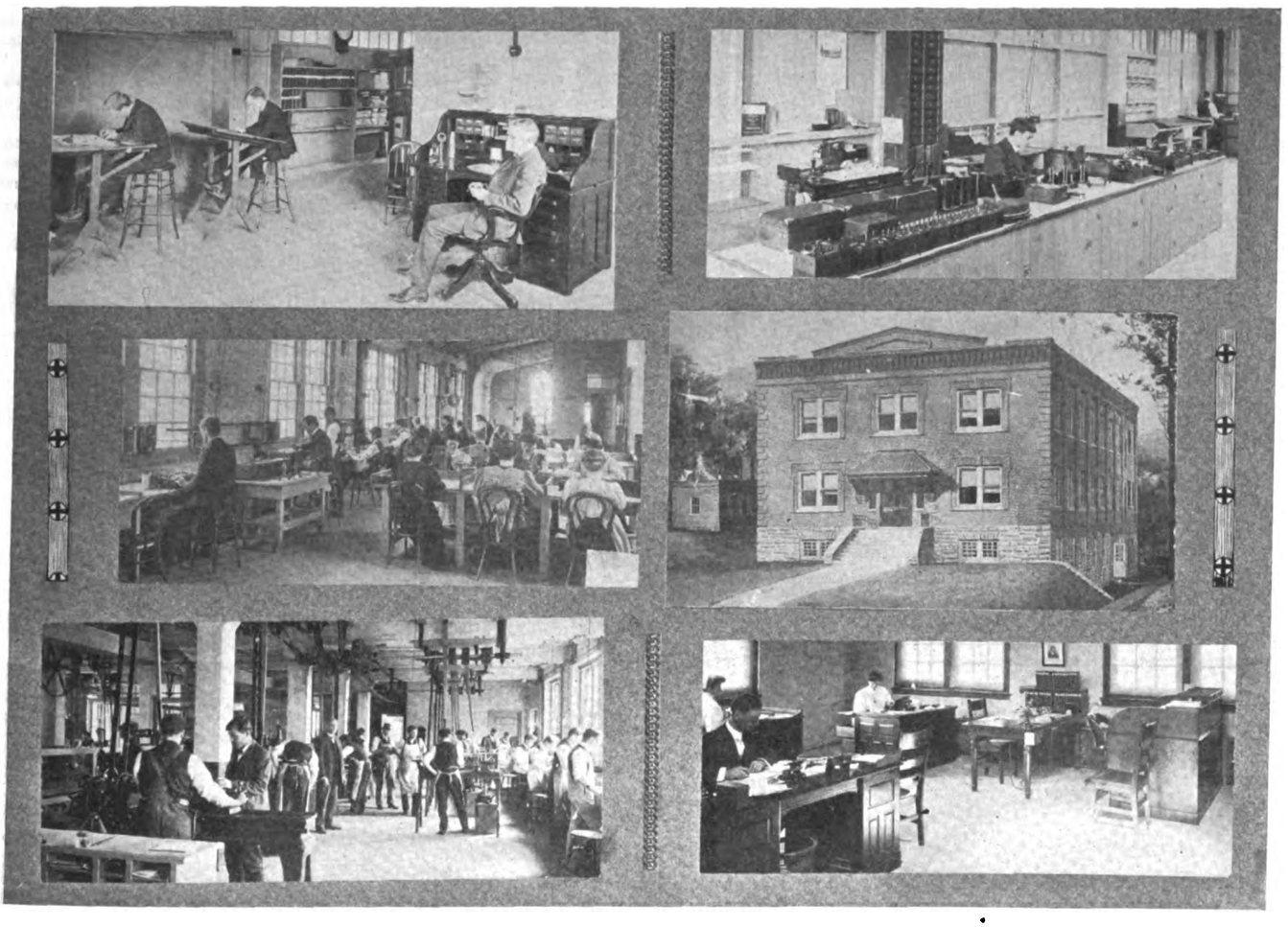
The shop occupies 85 feet of the second floor and is electrically driven. The equipment of tools and machines is specially adapted for the production of electrical measuring instruments. Co-operating with the shop and laboratory is an inspection department through which all apparatus must pass before shipment can be made. This inspection is most rigid, involving both mechanical and electrical tests, and thus insures the highest standard of workmanship, material and adjustment.

The basement is taken up by the heating and lighting plant, shipping room, locker room and wash room for the mechanics, fireproof vault for records and a well lighted room 52 feet x 55 feet for future manufacturing purposes.

The drafting and designing department is located on the second floor so as to be in close touch with the shop. In this department are filed accurate records and drawings of all apparatus manufactured. The sales office, stock room and show room are located on the third floor. In the show room are displayed, in easily accessible wall cases, a complete line of the more important instruments manufactured. In addition to this display a number of instruments are connected in circuit for demonstration under actual working conditions.

The occupancy of the new shop and laboratory has permitted the installation of additional machinery and an increase in their mechanical and laboratory forces. As a result, a larger amount of manufactured stock and standard parts will be carried, which will insure prompt deliveries.

A cordial invitation is extended by the owners to all interested persons to visit and inspect the new plant of the Leeds & Northrup Co.



Drafting and Designing Department.
North Side of Laboratory.
Shop.

Inspection Department.
The New Factory Building.
Selling Department Office.

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incorporated with a capital stock of $10,000. The company's line will connect the towns of Truxton, Fabius, Lincklaen, De Ruyter, Cuyler and all villages and towns in the counties of Cortland, Madison, Onondaga and Chenango. The directors are A. D. Theobald, M. D. Dunbar and J. B. Whitmarsh, of Cuyler; F. L. Hilton, A. R. Bryant and F. L. Woodward, of Truxton, and Randolph Hibbard, of Cortland.

PENN, N. D.—The Penn Rural Telephone Company has been incorporated with a capital stock of $7,000.

PLEASANT LAKE, N. D.—The Pleasant Lake Telephone Company has been organized. The incorporators are L. M. Holbrook, Anton Burow, J. H. Watson and W. F. Hanks.

COLUMBUS GROVE, O.—The Farmers' Mutual Telephone Company has been organized with the following officers: S. M. Keirns, president; L. D. Spafford, vice president; Samuel Williams, secretary; E. A. Fancher, treasurer.

OTWAY, O.—The Farmers' Union Telephone Company, Otway, O., has been incorporated with a capital stock of $1,000. The incorporators are F. C. Faul, J. E. Faul, H. R. Dugan, Edgar Dugan, E. J. Ogden, J. A. Laylin and others.

RAGERSVILLE, O.—The Ragersville Telephone Company, Ragersville, O., has been incorporated with a capital stock of $5,000. Incorporators are G. Weiss, Daniel Dall, William Miller, Charles Leiser and F. B. Gerber.

ALINE, OKLA.—The Aline Farmers' Mutual Telephone Company, of Aline, has been incorporated with a capital stock of $2,000. The incorporators are H. C. Geist, B. A. Field, G. A. Reiner, C. F. Geist and George Brown.

ENID, OKLA.—The Skelton Rural Telephone Company, of Enid, has been incorporated with a capital stock of $450. The incorporators are H. A. Thompson, J. J. Field, J. H. Gibson, A. E. Roever, of North Enid; H. E. Whitney, F. M. Barnhisel and H. P. Carter, of Enid.

GRANITE, OKLA.—The Farmers & Merchants' Telephone Company, of Granite, has been incorporated with a capital stock of $5,000. The incorporators are O. S. Laswell, J. A. Rice, J. G. Willis, Howard Arnett and B. F. Van Dyke.

LELAND, OREGON.—The Leland, Illahe & Port Orford Wagon & Toll Road & Telephone Company has been incorporated with a capital stock of $100,000. The company is to build a telephone line paralleling its toll road from Leland to Port Orford, about 90 miles. The incorporators are E. B. Burns, of Marial; Jacob Frye, of Illahe; J. D. Cooley, of Agness.

MOSCOW, PA.—The Pocono Mountain Telephone Company has been chartered with a capital of $10,000. It is to build lines in Lackawanna and Wayne counties. The directors are A. N. Sayre, J. E. Loveland and J. D. Callegan, of Moscow; R. J. Tanfield and William Cobley, of Daleville.

STROUDSBURG, PA.—The Stroudsburg & Bushkill Telephone Company has acquired the Monroe Telephone Company, and a new company is to be chartered under the name of the Stroudsburg & Bushkill Telephone Company. The new company will be capitalized at $33,000, and will make many improvements in its system, as well as establishing a long distance service.

INDIAN MOUND, TENN.—An Independent Telephone Company has been organized at Indian Mound, with the following officers: T. W. Seay, president; W. H. Green, vice-president; C. N. Keats, secretary; A. H. Seay, treasurer. The company will build lines all over the county.

BURLINGTON, VT.—The Burlington Home Telephone Company, with a capital stock of $100,000, has been formed. Patrick Tierney, of Plattsburgh, N. Y., who installed the Independent telephone systems at Plattsburgh, Potsdam and other places, is one of the incorporators of this company.

PERSONAL.

J. B. BRENNEN, formerly division line foreman of the Central Union Telephone Company at Columbus, O., has been appointed superintendent of construction for the Wisconsin Telephone Company, in Milwaukee.

H. B. BRYANT, of Raleigh, N. C., has been appointed manager of the exchange at Greenville, S. C., by the Southern Bell Telephone and Telegraph Company.

A. M. HAUBRICH, formerly connected with the Stromberg-Carlson Telephone Manufacturing Company at its Rochester headquarters, has recently been transferred to the Chicago office in the capacity of Western sales engineer.

WILLIAM J. HIBBERT, formerly with the American Telephone and Telegraph Company in New York City, has accepted a position with the Philadelphia Bell Telephone Company.

J. S. HUGHES, who has been manager of the plant of the Consolidated Telephone Company at Carbondale, Pa., has been promoted to the superintendency of a newly established district organization. He will have charge of territory which includes practically all of Wayne and Susquehanna counties and Lackawanna county as far south as Olyphant.

A. C. REYNOLDS has been appointed manager of the Hudson River Telephone Company's exchange at Port Jervis, N. Y.

A. U. RICHARDSON will take entire charge of the business of the Columbiana County Telephone Company in Columbiana county, Ohio. His headquarters will be at East Liverpool.

LE ROY TUCKER has been appointed manager of the exchange of the Colorado Telephone Company at Craig.

MISCELLANEOUS.

LA CROSSE, WIS.—Connections between numerous farmers' lines and the Independent exchange in this place have recently been made. The La Crosse Telephone Company has secured connections with the exchanges and farmers' lines out of Houston, Nodine, Rushford, Lanesboro and Preston. The Tri-State Telephone Company, which is connected with the La Crosse Company's exchanges, is rushing a double circuit of copper wire from La Crosse to Austin.

New Construction in the Field

MOBILE, ALA.—The Home Telephone Company is building a line from Mobile to Birmingham.

JULIETTE, FLA.—The East Florida Telephone Company is building a line to Dunnellon.

CHAMPAIGN, ILL.—The Home Telephone Company, of Champaign, is to spend $100,000 in rebuilding its system.

WILLIAMSBURG, MASS.—The Citizens' Independent Telephone Company, of Williamsburg, is planning to extend its system from Northampton to Easthampton.

WEXFORD, MICH.—The Wexford County Independent Telephone Company is extending its lines in the township of Wexford, and will also extend its system in Antioch.

BLOOMING PRAIRIE, MINN.—The Steele County Telephone Company is to make a great many extensions to its system.

CALEDONIA, MINN.—The Standard Telephone Company is to spend about $4,000 in improving its system. It will build a line to La Crosse, and expects to install a new five section 500 drop switchboard.

ERSKINE, MINN.—The Independent Telephone Company, at Erskine, owned by A. F. Cronquist, is to build lines to McIntosh, Winger, Fosston, Fertile and Knute.

BLAIR, NEB.—The Blair Telephone Company expects to make a number of extensions to its lines.

CENTRAL CITY, NEB.—The Independent Telephone Company, of Central City, is to build lines to Pierce Chapel.

SOCORRO, N. M.—The Independent Telephone Company of Socorro is to be connected with Albuquerque.

ELLICOTTVILLE, N. Y.—The Home Telephone Company, of Ellicottville, is to install an exchange at Sugartown.

TROY, N. Y.—The Commercial Union Telephone Company is planning improvements to its local service, which will double its capacity. It will increase the number of its switchboards and its cables and circuits in every section of the village.

GREENBRIER, O.—The Hamilton Home Telephone Company, of Hamilton, O., is to extend its lines in Green Brier.

ALBANY, OREGON.—The Home Telephone Company is making many improvements in its system.

JOHNSTOWN, PA.—The Johnstown Telephone Company is to extend its lines through West Taylor Township and Conemaugh Township.

PRICE, UTAH—The Independent Telephone Company is to build a line to Castle Gate and Sunnyside.

GREEN BAY, WIS.—The Brown County Telephone Company, which is to increase its capital stock from $10,000 to $20,000, contemplates numerous extensions in its system.

MONTREAL, QUEBEC, CAN.—The Grand Trunk R. R. is to spend $400,000 in installing a telephone system from Portland to Chicago.

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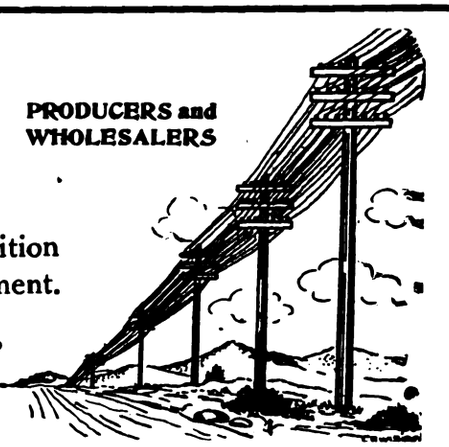

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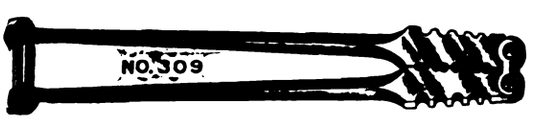

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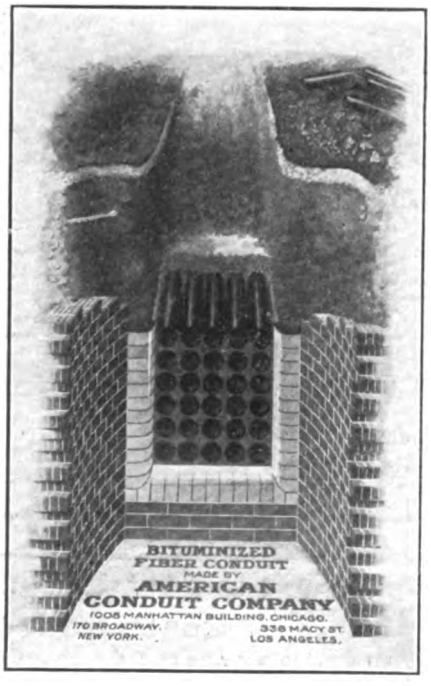

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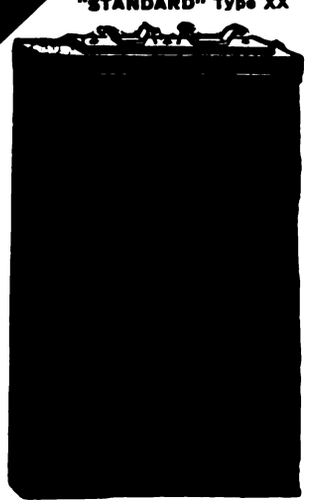

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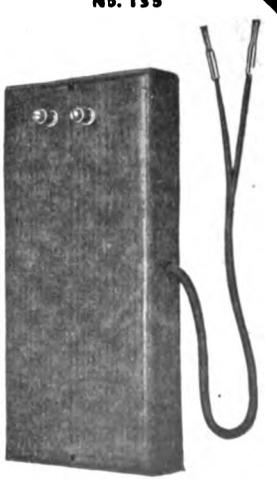

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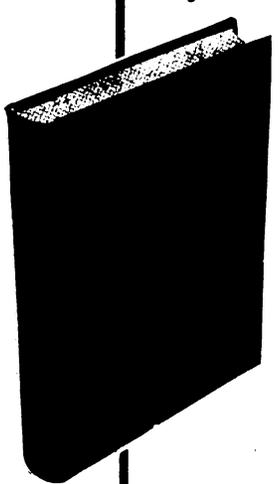

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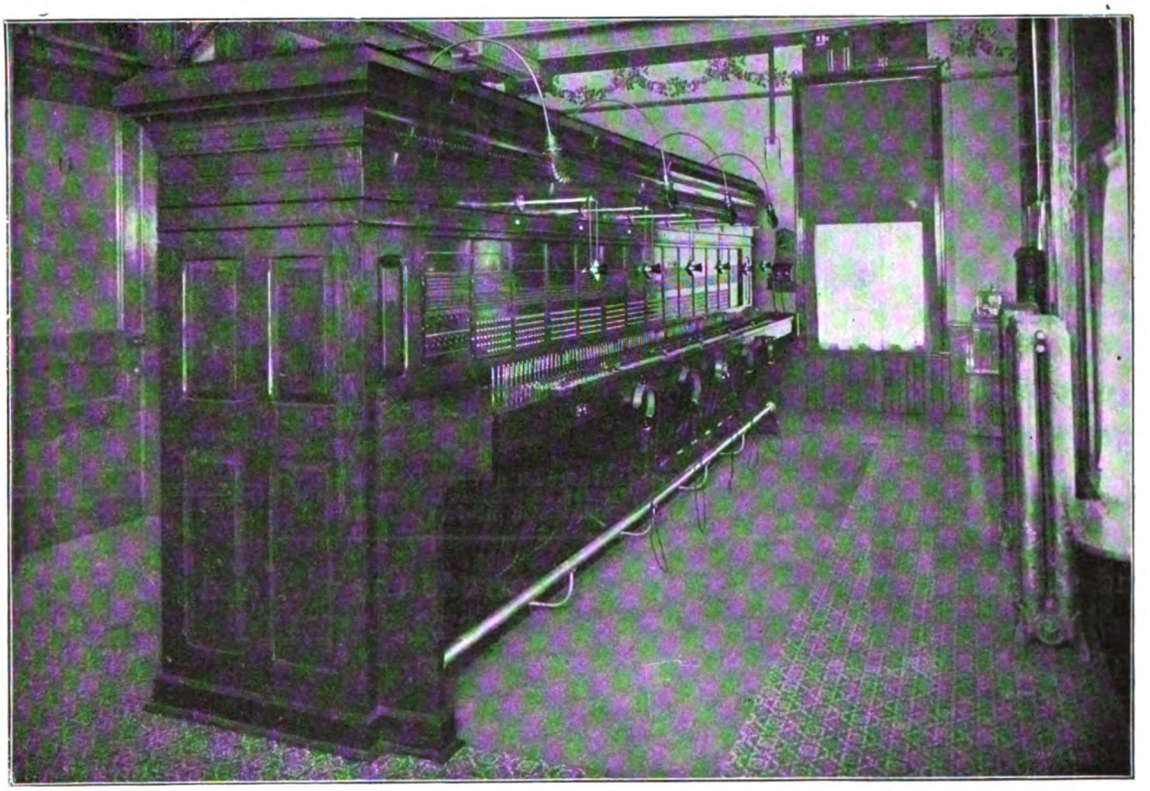
If you are in the market for common battery switchboards or telephones, it would be advisable to make an inspection of and test our apparatus.



You will find it superior in many ways.

We can refer you to Exchanges who have used our common battery apparatus with entire success for a number of years.

Let us make you prices on your requirements in these lines.

Samples will be shipped, charges prepaid.

CENTURY TELEPHONE CONSTRUCTION CO.

332 Ellicott Street BUFFALO, N. Y.

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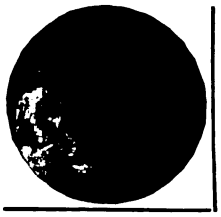
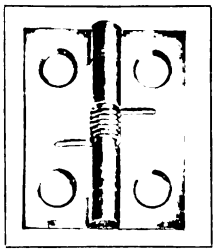


Little Things That Count

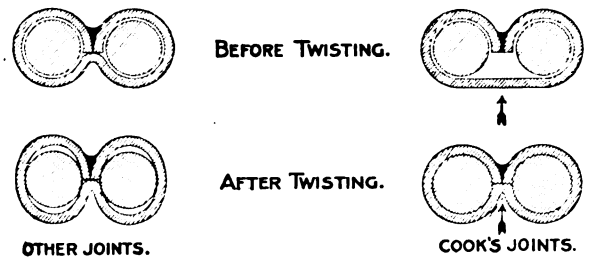
In MONARCH TELEPHONES the talking circuit is carried from the transmitter to the batteries by insulated cords. The ringing circuit passes through the hinges on the door, but these hinges are equipped with spring contacts as shown in the illustration. This feature positively precludes trouble from poor ringing contacts. A "LITTLE THING," and yet it counts.



MONARCH TELEPHONE MFG. CO., - - CHICAGO, U. S. A.

A PERFECT JOINT
The Cook Self-Welding Wire Joint

A joint made with the Cook Self-Welding Wire Joint is STRONGER THAN THE WIRE ITSELF



In the Cook Joint the mere act of twisting draws the sleeve into the recess between the wires, stretching it absolutely tight around both wires, making a perfect self-weld.

Send for a FREE SAMPLE, twist it up, cut it in two and see for yourself.

Air and moisture cannot penetrate and corrode the wire and joint. A perfect connection is assured by the use of the COOK SELF-WELDING WIRE JOINT. ALL SIZES. FOR COPPER OR IRON WIRE.

Frank B. Cook. Mfr.

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BE AS HONEST

with yourself as we are in the manufacture of *International* Apparatus. Give us the opportunity of estimating on your next order for telephones or switchboards. Recent installations in the U. S. and Foreign Countries are convincing.

International Telephone Mfg. Co.

HARRISON AND CLINTON STS.
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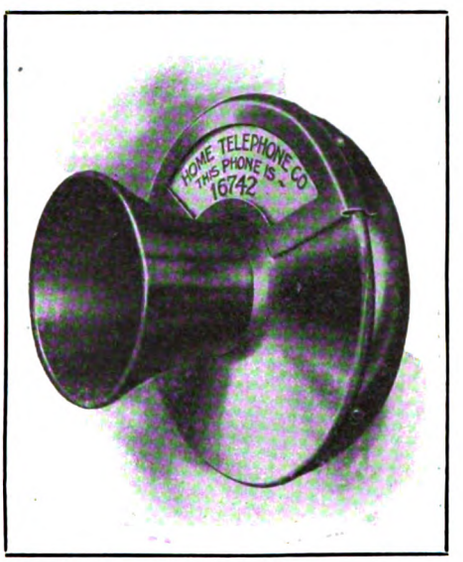
DEAN TELEPHONE APPARATUS

100,000



August 10th, 1904, the first Dean transmitter was placed on the market. During the twenty months of its existence there have been 100,000 put in use, many of which have replaced all other makes. For example, one Ohio exchange alone has replaced over 7,000 other makes of transmitters, many being of the latest design. *There must be a reason.*

Under extreme climatic conditions where other transmitters have packed after being installed only one to three months, our transmitter has stood up without any apparent change.

One exchange in particular, located in a damp Gulf climate, was forced to adopt our transmitter in order to exist. They replaced over 1,000 other modern transmitters with the Dean. It is now over eighteen months since this change was made, and no trouble has been reported.

Our transmitter from the first has set a new standard of excellence, not only in point of transmission, but in careful design and construction. The interchangeability and self adjustment of the parts, together with the moisture and acid proof construction, and the absolute non-packing insure an indefinite life of highest efficiency in operation.

All Dean telephones and switchboards are fitted with these transmitters.

Write for booklet on transmitters.

BRANCH SALES OFFICES

511 Kansas City Life Building
Kansas City, Mo.

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FACTORY AND GENERAL OFFICE
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THE DEAN ELECTRIC COMPANY
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KELLOGG PHILOSOPHY— —THE BEST IS THE CHEAPEST

KELLOGG
FREQUENCY POLE CHANGER

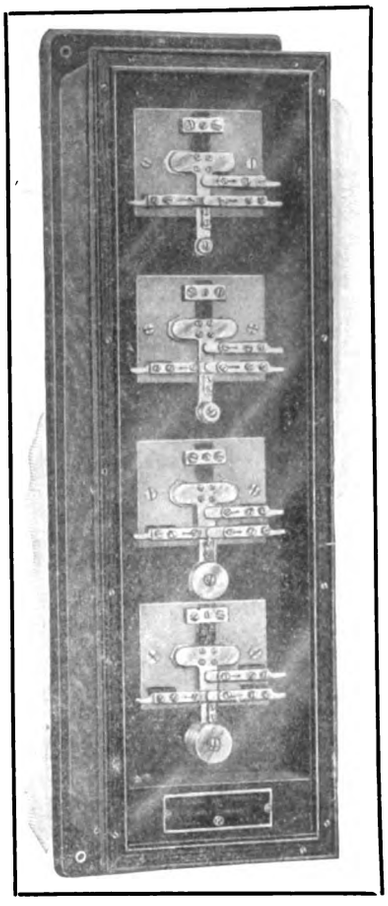
Utmost SIMPLICITY of Operation

THE EFFICIENCY

and beauty of the Selective Harmonic Ringing System of the Kellogg Company has been fully recognized by the entire Independent field, but the difficulty, heretofore, has been that the system required a generating device which involved a rather high first cost, and a relatively large consumption of energy.

The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



"FRONT VIEW"—COVER ON.

ADVANTAGES

1. Requires no attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. Dry cells can be used for the ringing current.
5. They can be furnished to work successfully under any load.
6. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
7. Operates successfully within the limits of 17 to 28 volts.
8. Noiseless in operation.
9. Only three contacts on each vibrator.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

Send for Folder No. 3 **Correspondence Solicited**

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES:

PHILADELPHIA, Keystone Tel. Building **CLEVELAND, Electric Building**

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Installed in 60 Seconds

Pulls on SOLID DIRT

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Specially designed to Replace "Dead Men"

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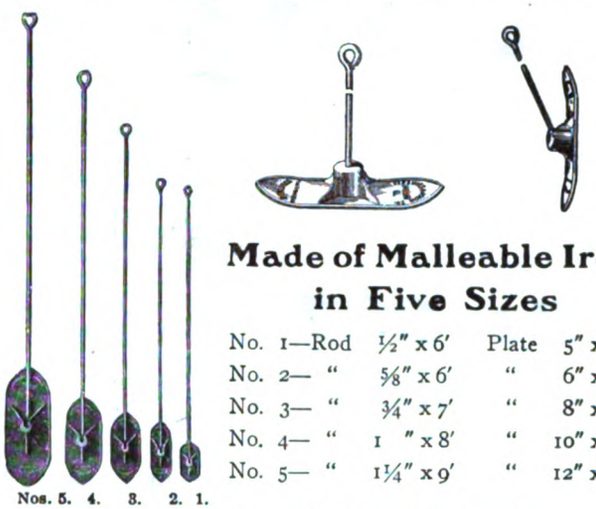

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THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 200 does the work.

Cash always accounted for.

No Errors,

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It protects both patron and company.

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Write at once for particulars and catalogue.

THE

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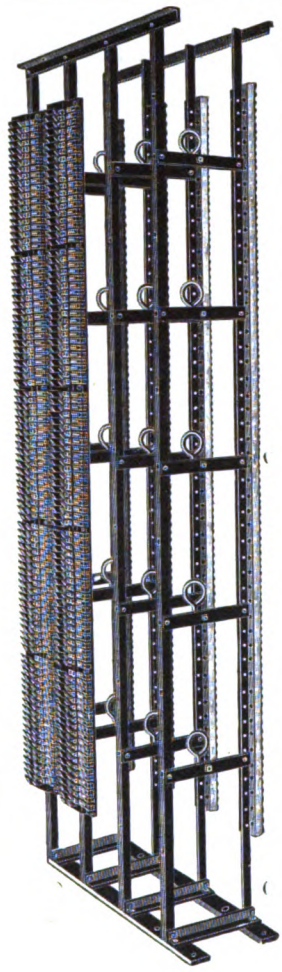

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Sterling Electric Company

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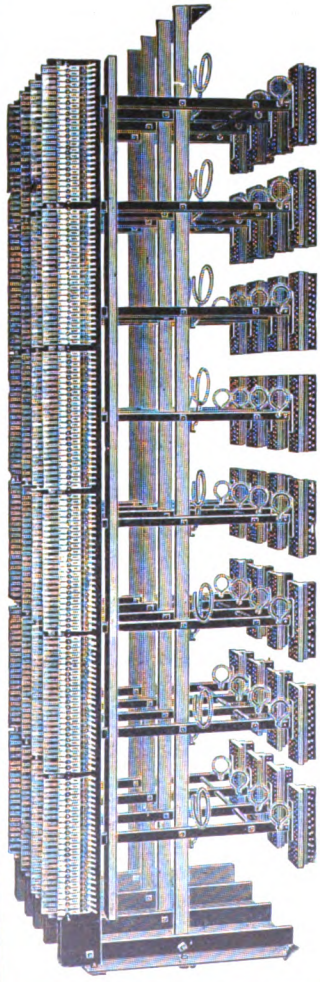

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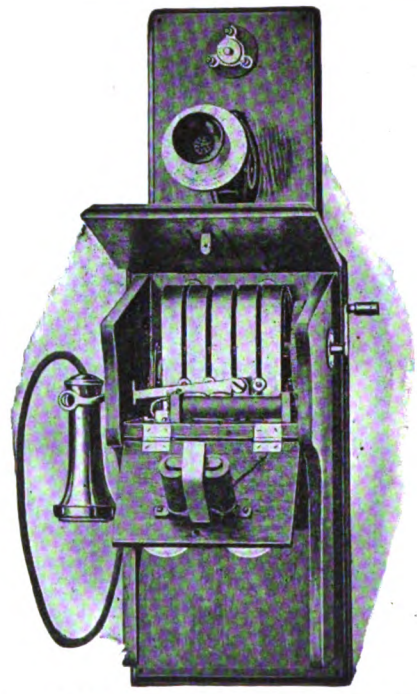

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Furnished for Any Combination. Capacity 3 Dry Batteries

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Correspondence invited

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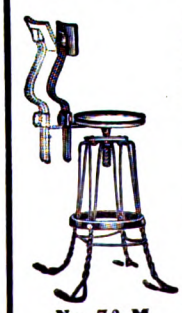

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The Most Comfortable High Chair Made

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INDESTRUCTIBLE—Nothing to get Broken

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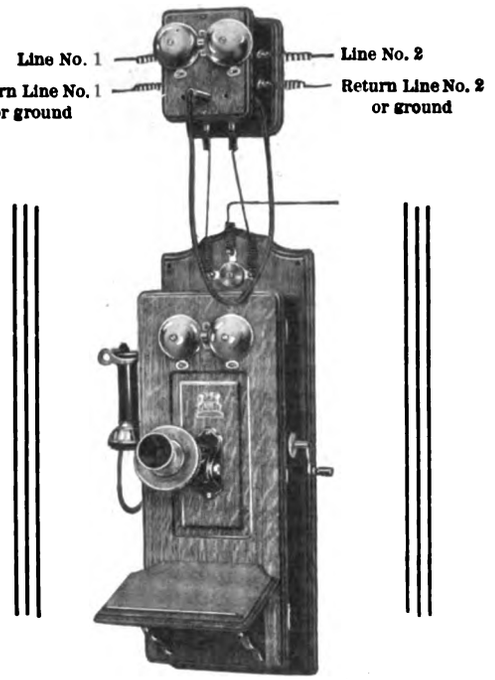

No. 99 CENTRAL TELEPHONE

When plug is inserted in jack as per sketch, lines Nos. 1 and 2 are both connected with the central telephone.

When the plug is inserted in jack No. 1, the central telephone is connected directly with line No. 1. At the same time any signal from line No. 2 will operate the extension bell. When the plug is inserted in jack No. 3 the central telephone is connected direct with line No. 2, and any signal from line No. 1 will operate extension bell.

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CHICAGO, ILL.

AKRON, Ohio—
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have all gone Automatic—Akron for 3,000 lines, Oakland for 5,000, Tacoma for 4,000 and Bellingham for 1,000.

Merit, absolute merit, was the reason why Automatic Telephone Equipment was selected by the Independent Companies in these cities.

They wanted the best, the very best, in telephone equipment.

They took their time and looked hard for it everywhere.

They found it in the Automatic.

That's where you will find it when you are ready to see it.

That's where the Independent Companies in all these cities found it—they adopted the Automatic:

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Van Buren and Morgan Streets, CHICAGO, U. S. A.

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Central Energy Telephones

Stromberg-Carlson

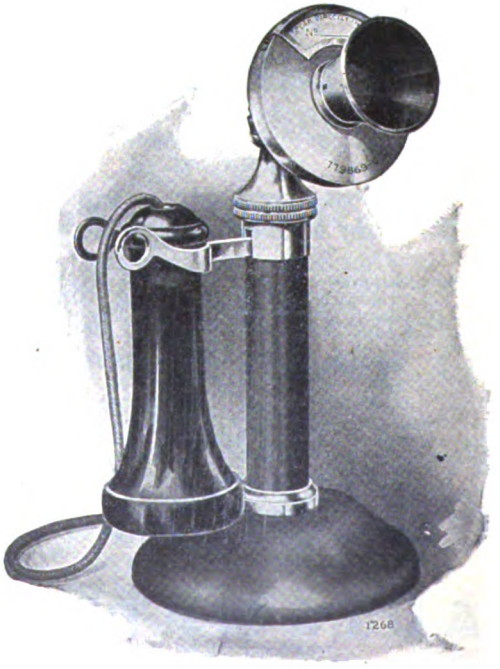
TELEPHONE MANUFACTURING CO.
ROCHESTER, NEW YORK

IF you use or contemplate using Central Energy Telephones it will pay you to get a copy of this new bulletin. There is sufficient evidence in it to prove that the telephones illustrated therein are without exception the most modern and nearest to perfection of any ever placed on the market. This statement is not based on the fact that our cabinets are better finished, that we have a better transmitter or a removable hookswitch, but the telephone taken as a whole.

There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?



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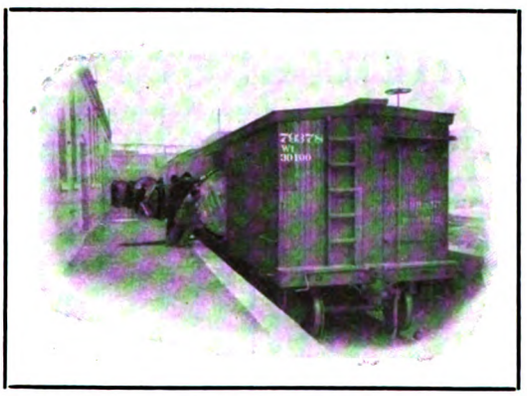
WE MAKE CABLE

All Indications Point Toward the Use of Cable for Future Line Construction

ITS advantages of economy in erection and maintenance alone far outweigh all claims made for open lines. In addition, it possesses exclusive features which effectively demonstrate its superiority as a means of distribution.

The wire plant is the most vulnerable part of a telephone system, and therefore should be constructed with the greatest care. The materials employed must be the best procurable to insure a safe margin of stability, and it is therefore imperative that in their selection due consideration be given to the validity of the claims advanced.



When Stromberg-Carlson Cable Reaches this Point, Everything Possible Has Been Done that Skill and Ingenuity can Suggest to Make it Perfect.

We emphatically state that the best grade of telephone cable on the market is made in our factory and we stand ready to furnish abundant proof.

First of all, we have a modern plant, the apparatus is the latest and the methods employed in manufacture are based upon experiences of the most capable engineers in the business.

Before a length of cable is shipped it is subjected to the most searching tests, and if a fault, no matter how minute, is detected, that portion is rejected. The specifications for our standard output call for the highest grade of manufacture, consequently the qualities of insulation, conductivity and transmission are of the highest order.

Send for our booklet 79B and read it over carefully. If you have had any previous knowledge of the art of cable manufacture you will be astonished at the point of perfection we attain; if you have not, you will learn much of interest that will convince you that where so much care is taken there you will be sure of getting what is right.

You may not be in the market for cable just now, but remember that when you are your best interests will be conserved if you buy Stromberg-Carlson.

The Standard of the World

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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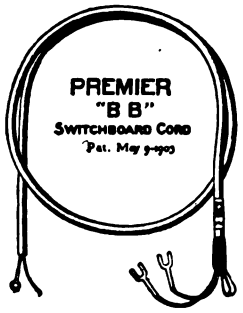

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For Use on Switchboards Where the Longest Life is Desirable

The Original PREMIER "B B" Switchboard Cord

Formerly Made by THE McDERMID MFG. CO.

We Make It Better Now Than Ever

This cord has that quality which guarantees you the minimum cord maintenance expense. Furnished in any length and number of conductors ready to attach to your plugs.

We carry a large stock and fill orders promptly. Our prices are right and we guarantee satisfaction. A trial will convince you. *Write for prices and information.*

PREMIER ELECTRIC COMPANY

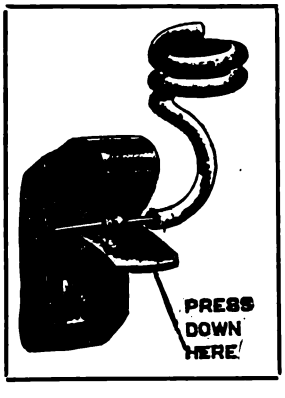
Sole Manufacturers

132 West Jackson Boulevard - - . CHICAGO

DON'T ALLOW YOUR JOBBER

to substitute dry cells equipped with the old style screw post when your order specifically states

FAHNESTOCK SPRING BINDING POSTS



It is just as easy for him to get the cells from the factory furnished with this post as with any other, and when he knows that you won't stand for substitution, he'll get them.

All you have to do is to be firm in your request and any sensible jobber will quickly realize that it is to his interest to cater to your wishes if he desires to hold your trade.

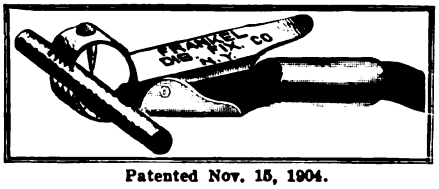
The Fahnestock Spring Binding Post is recognized throughout the country as being the best battery terminal, and all the manufacturers will equip their cells with this device *free of cost* if you ask for it.

FAHNESTOCK ELECTRIC COMPANY

129 Patchen Avenue, Brooklyn, N. Y.

Frankel Electric Testing Clips

Saves Baring the Wire



Dozen lots $1.50 doz.
100 lots 11c. each
500 lots 10c. each
1,000 lots 9c. each

Patented Nov. 15, 1904.

The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect connection.

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Electric Appliance Company.....Chicago, Ill.; San Francisco, Cal.
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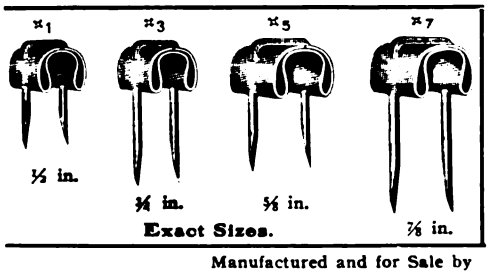
Monarch Electric & Wire Co.....Chicago, Ill.

OR

FRANKEL DISPLAY FIXTURE CO., 740-742 Broadway, N.Y.

Blake Insulated Staples



Enable wiring to be done in one-half the time required for cleat work. They cost less than the screws alone used with porcelain cleat work.

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BLAKE SIGNAL & MFG. CO., 246 Summer Street BOSTON, MASS.

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Western Electric Company.

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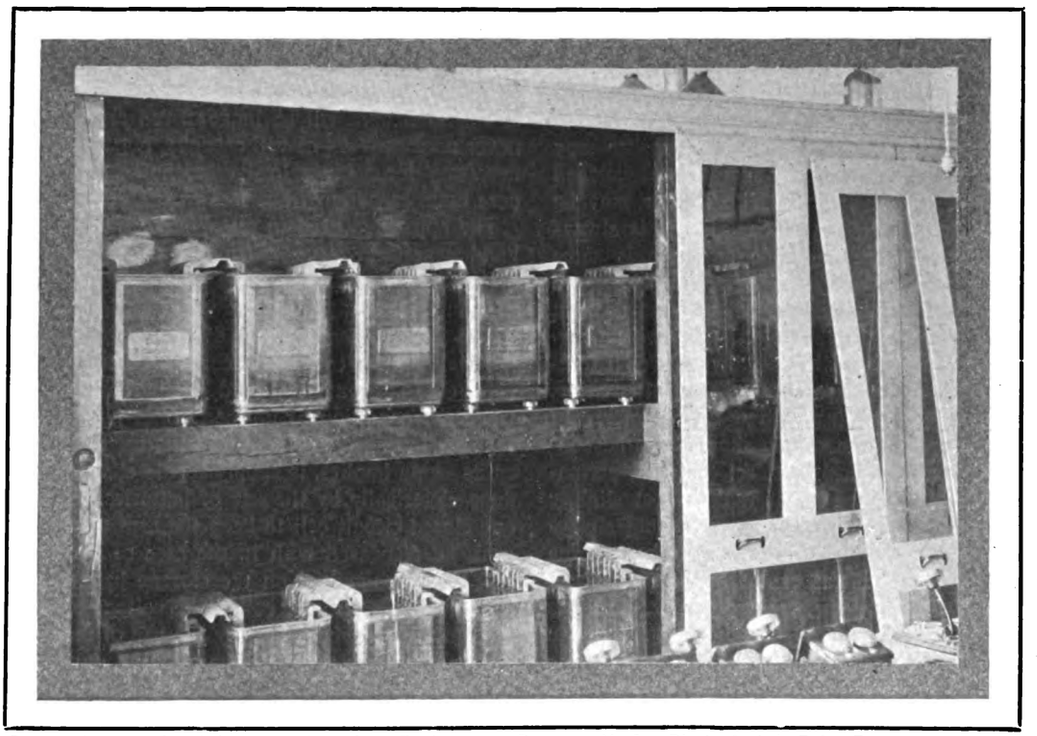
VOLUME XII *SATURDAY, APRIL 21, 1906* *NUMBER 16*

Power Data for Telephone Men

By P. Kerr Higgins.

IN concluding this series of articles it will be appropriate to consider the elements which go to make up the power plant of the average large telephone exchange, both manual and automatic. These elements may be considered under the following heads: Power machines; power board; accumulators; gas or gasoline engine. In considering these it might be well to give the equipment at one or more typical exchanges as indicating what is necessary in such an exchange.

At Louisville, Kentucky, the manual exchange has an ultimate capacity of 12,600 lines. The power equipment consists of a double set of charging machines, made by Roth Bros., each of 12 kilo watts capacity, one to operate on a 500 volt direct power circuit and the other on a 220 volt power circuit. Each generator output is 200 amperes at 60 volts. A ringing dynamotor is also provided with the primary on a 500 volts direct current circuit: the secondary delivers 100 volts alternating, complete with "howler," "busy back" and intermittent ringing attachments. An emergency dynamotor, for ringing purposes, is also provided to be operated by the storage battery. These are mounted on a suitable sub-base. An Italian white marble power board is furnished, having two Weston flush type ammeters, scale 0-200, one for charging current readings and the other the discharge; one Weston flush type voltmeter double scale, 0-3 and 0-75, with a six point voltmeter switch to obtain voltage at different parts of the power circuits and that of individual cells. The following switches are used: 3-200 ampere double pole, double throw knife type for charge and discharge, two 50 ampere 500 volt double pole single throw for motor generator; two 25 ampere double pole single throw for ringing generator, and suitable switches for cutting in the ringing circuits. An I. T. E. over and under load circuit breaker is provided with the charging machines, the whole board being suitably illuminated at night by incandescent lamps. All the apparatus is copper faced and highly polished. A fuse panel, with alarm, is provided, and all circuits and switches properly designated to avoid mistakes. The battery plant consists of two sets of accumulators of 20 cells each, in lead lined tanks, type G. Provision is made for adding plates so as to make the battery have sufficient capacity for 12,600 lines, each battery being sufficient to run the exchange for twenty-four hours without recharging. All wiring is done in iron armored conduit, with flexible circular loom where necessary.



Storage Battery Stand in the Independent Exchange at Paterson N. J. Black Asphalt Paint Protects the Woodwork from Acid. Glass Doors Allow Inspection.

At Grand Rapids, Michigan, the ultimate capacity of the automatic exchange is 10,500 lines. The power apparatus consists of two Sprague 4.1 horse power dynamotors for charging the batteries, run on 220 volt direct current and delivering 75 volts to the battery. Two Holtzer-Cabot type E ½ horse power motor generators run on 220 volt direct with a delivery of 75 volts on the ringing side. An emergency Holtzer-Cabot dynamotor to run off the battery at 50 volts is also furnished. Two battery interrupters for furnishing current to rotate the automatic switches, directly coupled to two Sprague ¼ horse power motors. The power board is of pink Tennessee marble with suitable ammeters, voltmeters, over and under load switches, rheostats and circuit switches, copper faced and polished. The battery consists of two sets of twenty-six cells each, the battery having a capacity of 400 ampere hours. Separate battery is also provided for the toll board, consisting of two sets of twelve cells each.

At Columbus, Georgia, the automatic exchange has an ultimate capacity of 10,000 lines. The power equipment consists of two charging machines, Holtzer-Cabot make, each with a 2

Continued from the issue of April 14th.

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horse power motor generator, having an alternating current 220 volt motor directly connected to a 75 volt current generator. One ringing machine motor generator consists of a ½ horse power 110 volt alternating current motor connected direct to the ringing generator, arranged to give 75 volts, and equipped with busy back and interrupter commutators. The power board has two panels of Italian marble, complete with suitable ammeters and voltmeters, over and under load and circuit switches, fuse panel, etc. The storage battery consists of one set of 26 cells, 100 ampere hour capacity, in glass jars. The other set twenty-six 50 ampere hour cells.

These give a partial idea as to the power equipment necessary in the average exchange. In connection with some systems using the harmonic system a special ringing machine is necessary to provide different frequencies, e. g., in the Frontier exchange of Buffalo, such a machine has currents of 2,000, 4,000, 6,000 and 8,000 alternations per minute created by four direct connected machines. In order to furnish what is known as "Tone" and "Busy" tests an interrupter must be attached to the ringing machine. Such an interrupter should be one giving a high note or hum, and it consists of a plain metal disc and a commutator built up of metal segments and insulating material in the usual manner. A circuit from the exchange battery includes the primary of a tone test transformer or coil and the interrupter. Such interruptions induce a current in the secondary which is used for special tests such as trouble or busy tests. The purpose of the "Howler" circuit is to raise a party who has left his receiver off the hook, and an interrupter may be used to provide current for this purpose. The howler must not be confounded with the tone test, which is only a mild hum. The principle of the howler is the same as the tone test.

Naturally the efficiency of the power plant, or the amount of energy received for the amount put in should receive careful consideration in designing. The power for such purpose may be derived from a commercial circuit or city supply, or developed by a gas, gasoline, oil or steam engine. The former may be the 110, the 220, or the street car 500 volt circuits. It is always best to use the 110 volt wherever possible as there is some danger associated with the use of the 500 volt circuit. The street railway circuit cannot, as a rule, be depended upon on account of the variation in the voltage. In the selection of which current is most desirable and economical it is always well to remember that direct current motors are cheaper than alternating, but the maintenance and cost of installation are greater. In making the selection the cost of the supply should also be considered. In any case it is always best to select the most permanent and reliable source of supply even if it does cost slightly more. If possible more than one source of power should always be at command, and if not obtainable, a gas or other engine should be installed. The use of a gas engine belted to a direct current charging machine, of say three horse power, develops about one horse power for each pint of gasoline at 75° with an efficiency of 75% for the generator. It will also give similar results with coal gas (20 cubic feet per horse power). The efficiency of the combination of a motor and generator is about 55% for a one kilo watt machine. Such rating varies with the size of the machine, being greater in the larger machines.

The rates charged for commercial current supply varies from four cents to 18 cents per kilowatt hour, according to locality and local conditions existing, and the amount of current required by the consumer. The question has often been asked whether it is cheaper to use the commercial supply or the gas engine supply. In answer to this I would say that for the smaller exchanges, say up to 2,000 or 3,000 lines, the commercial supply is best, but above that it is found that the supply of power by gas engine is about one-fifth of that taken from the commercial supply. It is wasteful to charge storage batteries under any circumstances by means of lamp resistances instead of a generator, and such practice should only be resorted to in case of necessity. It is customary to allow 2% for fall of potential or loss in the supply leads. The practice of running the machines in conjunction with the storage battery in supplying current to the system, during the heavy peak of the load (say from 8 a. m. to 6 p. m.) is found to be real economy. This system permits the charging machines to carry the load of the entire system and whatever is left is stored up in the accumulators, these acting as an overflow reservoir for the surplus energy. The practice of charging batteries at night, which for a long time was considered best, has now been abandoned and the batteries charged during the busy part of the day as stated; provided always that the efficiency of the motor generator does not fall below 51%, at which time it is economy to run the system on the batteries and shut off the charging. The efficiency of the accumulator varies considerably on account of internal changes represented by the I^2R, internal loss in the cell proper. The efficiency as stated should not be less than 80% and the capacity (ampere hour) about 95%, on an eight-hour rating, which is customary with all manufacturers. Great care should be taken not to allow the lead tanks to get grounded, as peroxide will be formed on the lining and a leak result which is hard to repair; neither should any connection exist between the lead lining of one cell and another for the same reason. Anything and everything which has a tendency to pull down the efficiency of the power plant should be carefully avoided, such as dust, poor contacts, deposit in the cell, wrong relations between the internal resistance of the cell and the external resistance, poor commutators on the machines, etc.

Cells allowed to drop in voltage lower than 1.9 volts are hard to bring back to the same state of efficiency that existed prior to letting them down, so that while cells at 1.9 volts may not show any visible deterioration, a careful analysis of their efficiency will show a much lower standard than before, if left at less than 1.9 volts for any length of time. Batteries should be slightly in excess of the capacity necessary to carry the system at full load and will be longer lived and show better results if never used over .75 of full capacity, e. g., if 600 ampere hours are necessary for a given load then the battery should have an ampere hour capacity of not less than 800.

The apparatus used in telephone exchanges may be either the hand generator for very small exchanges; a pole changer for the medium sized exchanges; or a motor generator for medium and large exchanges.

The hand generator is a dynamo in its simplest form and is too well known to require comment here. The pole changer is very cheap, economical and easily handled. In this machine when the condition of no load exists no power is expended, except the internal local action in the battery itself. This machine, as its name implies, is simply a pole changer, the changing being done electrically by the use of batteries. It is customary to use one closed circuit cell to keep the arm vibrating; this may, however, be dispensed with in the case of a central energy system, and the machine run on the storage battery by the introduction of a suitable resistance coil. The voltage or strength of the ringing current may be varied by the use of more or less cells, using a plug and jacks to cut in the required number.

The motor generator is made up of two machines mounted on the same base, with shafts connected by an insulated flexible coupling. Such a ringing machine may be run from the commercial supply circuit. In the primary direct current may be used, and in the generator pulsating or alternating current. The fields in both may be excited by supply from the commercial mains, thus simplifying the machine. The relative efficiency between a motor generator and a dynamotor shows the latter to be preferable. In the case of the dynamotor the conditions are more favorable because of the fact that the two armature windings tend to neutralize each other, being mounted on the same core. Hence, on account of this arrangement the voltage at the generator will depend directly upon that supplied to the motor, being varied only slightly by variation in the strength of the field. In such a machine it is also well to note that the two units are entirely separate, one from the other, electrically. It is much more compact, neat, and of less weight for the same work done. The motor-generator and the dynamotor are similarly wound, being in the shunt wound type, and both are oper-

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ated in constant potential circuits. The connections of the motor run directly to the mains, and the generator winding is carried to the exchange ringing supply. It is to be noted that the pressure or the current may be regulated by a variation of the resistance in the armature of either the motor or generator, or by rearranging the brushes on the commutator. In the dynamotor such regulation can only be done by inserting resistance in series with either armature. The difference between a dynamotor and a motor generator is the dynamotor is a machine combining the motor and dynamo and is used for transforming a current from one voltage to another. It has one magnetic field in which the armature fields of both primary and secondary rotate, being separate windings over the same core. The motor generator is two separate machines. A motor and a generator run on the same shaft independent of each other and used for the same purpose as the dynamotor, being separate any arrangement of the fields is possible.

The care of power machines and their subsidiary apparatus including accumulators, is extremely important. They seldom receive the care they deserve, with the result that the depreciation in these is enormously greater than it would be if they were properly taken care of. In taking care of such a certain amount of experience is absolutely necessary, in order to detect and observe faults before they become chronic or fatal, and to remedy the faults found.

The same treatment should be accorded power machines in the telephone companies as in the light and power companies. One of the first things to be watched is the temperature of the machine, which should not be allowed to exceed 45 degrees above the temperature of the room. The field coils and armature suffer most in this respect, but no danger may be anticipated if the temperature does not exceed 125 degrees Fahr. Another feature deserving attention is to avoid all vibration due to looseness of the bearings or bolts, or both; maintaining also a perfect alignment of shafts. Sparking should be avoided, a continuous lubrication, vaseline preferred, being used. The brushes should be set diametrically opposite each other, resting as lightly on the commutator as is consistent with a good contact. All the bearings should run perfectly cool. If flats or grooves exist or present themselves on the commutator, the armature should be taken out and evened up by turning on a lathe. The commutator, if properly cared for and in good condition, can be known by the color, which should be a fine dark copper polish. A good machine in good order should run almost without noise. Noise generally indicates that the machine is out of adjustment or something loose. Great care must be had to avoid all dust and to cover the machines when not in use. In the event of fuses being blown they must always be replaced by others of the same denomination so as to avoid the possibility of over loading the machine and damaging the same. All contacts and wire terminal points should be frequently examined for looseness or dirt, which cause trouble. In starting up the machines great care should be exercised to cut out the resistance slowly so as to allow the back E. M. F. in the motor to be fully generated before all the resistance is cut out.

The machine piers should be built on substantial foundations, being located on the first floor if possible. The top of the pier may be made of a slate slab perfectly level; below this the pier should be of pressed brick on the outer walls. The interior of these walls may be either hollow or filled as circumstances dictate, or angle iron may be used. The gas engine pier should be very substantially built of brick and concrete, the outside and top being in harmony with the other piers. Suitable anchor bolts may be used and these are generally furnished by the manufacturers. Great care should be had in making provision for the conduit outlets, as these will be hard to straighten out after the foundations are set.

All leads should be in iron armored conduit, and wherever possible should be laid under the floor. If possible all the charging machines except the gas engine and its associated dynamo should be mounted on one pier; the ringing machines may be on a separate base.

In large battery and power installations the leads are frequently very heavy, so that ordinary splicing cannot be resorted to. In splicing such cables, the wire in strands must be thoroughly cleaned, removing all the insulating material. The best binding wire to use is No. 16 copper. The use of a sleeve is sometimes resorted to instead of binding, and this sleeve may be either brass or copper. In making the joint it should be thoroughly heated and the flux well melted and run. If the lead is very heavy, a hole may be bored in one end and the other reduced to fit this and sweated in. If there is no strain the two wires may be reduced and bound together, the whole being sweated in. In stranded work the strands are fed into each other one at a time, alternating from side to side. They may then be bound together and soldered.

Warning to Investors

By James B. Hoge.

SOME of the paid representatives of our opponents are, apparently, very much exercised about the investing public becoming interested in Independent telephone securities, claiming that their people have recently arranged for large amounts of additional money which is to be used in purchasing Independent properties and fighting the Independents. No one thoroughly in touch with the Independent situation will be at all frightened by such threats. In the past, the Bell people have spent several hundred thousand dollars of their funds in buying out a few poorly constructed properties at fabulous prices. In practically every case new up-to-date Independent exchanges have been built to take the place of those sold, and the new companies have proven stronger and more successful than the ones purchased. A few instances that might be cited are Toledo, Ohio; South Bend, Indiana; Detroit, Michigan, and Portland, Oregon.

The Bell company recently spent considerable money in buying out some of the Independent properties in Missouri, generally paying from two to three times what they were actually worth. Among these are Kirksville, Carrollton, Monett and Pierce City. The City Councils at Kirksville and Carrollton have already granted new Independent franchises, and these cities will be rebuilt by the Independents at once. The Pierce City and Monett people have offered the Independents a franchise in each place, which will be taken up at an early date, and these cities will also be rebuilt with up-to-date Independent exchanges. About a year ago, the Bell purchased a controlling interest in the Independent company operating at New Lexington, Ohio. The Independents recently secured a new franchise for that town, and are now making active preparations to rebuild. In each of the instances just mentioned, the people have pledged their support to the new Independent company, and the Bell's investments in these towns have gone for nothing. There is no doubt, however, that they will continue to spend more of their money in buying out the properties of other weak companies in the hopes of stampeding the Independent movement. They seem to overlook the fact that Independent telephony is far beyond the experimental stage. The Independents were weakest when the movement began. Every month is adding to their strength.

Numerically, we are stronger than our competitor. If necessary, we can readily afford to let them make further purchases,

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and still have more telephones in service than they; especially in view of the fact that the Independents are increasing upon an average of 50 per cent faster than the Bell. Besides, as proven by past experience, their difficulty seems to be to retain control of the towns they purchase.

We have more than fifty times as many investors in our securities as the Bell. Our investors are not confined largely to old many places in order to hold the business. Neither do the Independent people seem to find it necessary to carry in their directories the names of people who are no longer subscribers in an effort to deceive the public regarding their real strength. This is a common practice with the Bell.

Every Independent man knows that the properties he is looking after are growing and demanding his attention. This situation

OFFICIAL BULLETIN NUMBER TEN OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

MAPS:

A map has been commenced for New York, making fifteen states for which Independent toll line maps are being prepared. These maps will be displayed at the Chicago Convention, showing all lines for which data have been received. IF YOU WANT YOUR SYSTEM INCLUDED, SEE THAT DATA REACH US NOT LATER THAN MAY 25TH.

CONVENTION:

As previously announced, the annual Convention will be held at the Auditorium Hotel in Chicago on June 26th, 27th and 28th. The various committees will meet at the same place June 25th. The Convention program is now being prepared. Every one interested is invited to suggest subjects to be discussed, and the names of gentlemen who could prepare papers on same. If you think certain matters should be given special attention at the meeting, write this office AT ONCE.

IMPORTANT.

The Convention this year will be the most important gathering of the Independent interests that has ever taken place. On account of the publicity given the movement through the magazines, journals and press of the country during the past few months, it will attract national attention.

All Independents are invited to attend. Come yourself, and bring your Independent friends. Give your delegates the proper support, and see that YOUR SECTION *of the country is well represented.*

WARNING TO INVESTORS:

Read President Hoge's letter printed in this issue.

INDEPENDENT GROWTH:

The Independent telephone interests of Oklahoma and Indian Territory have been organized under the name of the Oklahoma and Indian Territory Telephone Association. Mr. H. Furman, of Geary, Okla., is President, and Mr. L. T. Hine, of Purcell, Indian Territory, is Secretary and Treasurer. On behalf of the Independent interests of the country we extend to them a hearty welcome and best wishes for their success.

A new copper toll line from Nashville, Tenn., to the Gulf of Mexico will be completed in about four months. Franchises are pending at Cincinnati, Ohio; Omaha, Neb.; Milwaukee, Wis.; and other large cities at present without Independent exchanges.

The Home Company of Detroit, Mich., is securing new contracts at the rate of seventy-five (75) per day. The Twin City Company at Minneapolis and St. Paul is increasing the number of its subscribers at the rate of 500 per month. Similar activity is noticeable among the Independents in all parts of the United States.

"LOOK FOR THE SHIELD":

This phrase, suggested a few months ago as a slogan, has found favor with Independent people all over the country. We endorse its adoption as the Independent watchword, and recommend its general use in advertising, and on all printed matter.

SUPPLY DEPARTMENT:

The use of the Shield throughout the country is steadily increasing. Independent companies in thirty-seven (37) States are now taking advantage of our Supply Department, and assisting us in introducing the emblem. We will be glad to have your help in this, and will send illustrated catalog if you wish it.

Have you seen the Independent shield buttons? Samples 35c. each.

estates. Over 75 per cent of those having their money invested with the Independent movement are people who are active, and following up their investments in a business-like way which enables their companies to get the cream of the business. In this connection, I should like to quote from a recent address made by Mr. J. H. Shoemaker, of Iowa:

"Think of Iowa, with its hundred counties and only two or three individuals representing our opponents who have authority to determine how far the tactics of to-day may depart from the former fixed policy in any given case. Then think of the Independent men, who are not only in every one of the hundred counties or all of the sixteen hundred townships, but in nearly all of the fifteen thousand school districts as well."

We have no record of Independent telephone companies giving away telephone service free as our competitors are doing in so is general. Judging from reports already received, if the Independent companies would all report to one central point the amount of new money they are going to invest this year, it would be found far in excess of the amount which representatives of our competitor brag about in a "confidential" way to bankers and brokers as being *appropriated* to buy out the properties of the Independents, and injure their securities.

Don't be stampeded! Any one who has money invested in Independent securities to-day has a good investment in a growing business. Independent securities are steadily increasing in value and occupy a higher place in the financial world than ever before—*confidential* Bell statements to the contrary notwithstanding.

THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION,
BY JAMES B. HOGE, President.

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Leland Hume---Telephonic Jekyll and Hyde

WHAT HE SAYS AND WHAT HE DOES!

"He should make it a rule, above all things, never to utter anything which does not breathe of kindness, justice, good faith and piety; this last quality is most important for him to appear to possess, as men in general judge more from appearances than reality." Niccolo Machiavelli.

FEAR of competition has led the officials of the Cumberland Telephone Company into many acts which are not to be justified by even the most lax code of business morality; yet of all the men in Nashville there is none whose public utterances are designed to convey the sentiments of an upright character more surely than do those of General Manager Leland Hume. But each step toward the inevitable loss of his company's once uncontested position in the field which it occupies shows some new phase of his character which would never be suspected from his carefully prepared speeches of piety and good will and upright loyalty to the things which are just. In a fight he is vigorous, resourceful—but he wishes to win by craft and concealed means, rather than by coming out in the open. His methods have received most unfavorable criticism from citizens who have acquired some knowledge of the methods he has used to defeat Independent franchises in city councils. At such times the improper use of money has been frequently mentioned. The way in which he sought to influence the action of the governing board at Spring Hill is revealed in the following letter which was printed in the Nashville *American* on the 7th of April. To prevent the reader from becoming wholly disgusted at the contemptible effort to force this young man's father to abandon his convictions, we have broken the description by the insertion of utterances of the sort Leland Hume has made in public, before his fellow employees. Here is the letter:

"To the Editor of *The American*:

Since you published in this morning's *American* a clipping from the Columbia *Herald*, giving the substance of my recent discharge from the Cumberland Telephone & Telegraph Company, I desire to ask for sufficient space in your columns to state my case, so that I may not suffer in the estimation of the public from being discharged further than my conduct has merited.

For something over five years past I have been connected with the electrical shops and the electrical engineering department of the Cumberland Telephone & Telegraph Company, doing electrical and engineering work of various kinds in its service. On Monday morning, March 26, while at work at my usual duties in the electrical engineering department, I was unexpectedly summoned by telephone to the office of Leland Hume, the General Manager of that company, for my first interview with him.

> "My Fellow Employees * * * I promise you, as a servant of this company that I will give to you everything that is your due."

Upon reaching the office Mr. Hume informed me that he had on the day before been on a visit to Spring Hill to the family of his brother-in-law, W. C. Branham, and had learned there that the Mayor and Board of Aldermen at Spring Hill, of which Mr. Branham is a member, had granted a franchise for another or Home Telephone exchange, at Spring Hill, and that he had learned that my father, Dr. James O. Hardin, an Alderman at Spring Hill, had voted in favor of this franchise. I replied that

> "The fact that you are on the pay roll is proof that the company wishes you well, and the men that have been with the company the longest will be the first ones to testify to its kind, considerate treatment."

this was the very first intimation I had even of the intention of the Home Company to build in Spring Hill, as I had had pressing duties that had occupied all my time in the electrical department, and I had not kept posted on other affairs, and that I further presumed that my father had acted as he thought right and without conferring with me. I stated further that while I always desired to do what I could honestly in behalf of the company I was working for, I could not see how the way in which my father voted in the matter (entirely unknown to me) could in any way affect my connection with the technical work in the electrical department of the company, and why I should be drawn into the matter in any way whatsoever.

At this time, I understood from Mr. Hume that the franchise granted must be for a local exchange only, and I told Mr. Hume that I honestly believed two telephone systems would be impracticable in so small a place as Spring Hill, and that, had I known in time, I might have expressed my honest convictions on this point to my father openly in the interest of the company I was working for.

Mr. Hume thereupon immediately told me to talk to my father over the long-distance telephone and ascertain definitely what

> "I am here to say that there is not a day that we are not engaged in trying to do the right thing."

had been done in regard to the franchise, and whether he had voted for it, which I immediately did, ascertaining from my father that he had voted in favor of the measure, as he and other members of the Board had deemed it expedient, and that a franchise had been definitely granted. This I reported to Mr. Hume; whereupon he said that unless my father and all of my people could be loyal to my interests and those of the company I was working for that I might never expect any favor from them again, and that "he would not give the snap of his finger for my chances in the future with his company after this."

> "A man must be true to himself, or he will never strike the right road to success. Now, you show me a man that is true to himself inside and out, and I will show you a man that the company can lean upon."

He ended this our first interview on this subject by stating that he was not discharging me for this, but "unless every one of my blood could be loyal to the company" I might expect no favors from him toward advancement in the future.

The following Sunday I spent in Spring Hill and conferred with my father and Mr. Branham in regard to the matter, stating the substance of my interview with Mr. Hume. Both expressed surprise and astonishment that Mr. Hume could hold me responsible and my position with the company in danger on account of the way my father, a public officer, had voted. I further learned that the franchise that had been granted by the Mayor and Board of Aldermen at Spring Hill was for a competing long-distance telephone company.

> "If you want to succeed in your undertakings, in your legitimate, and honest undertakings and endeavors in this life—in other words if you want to succeed in your business—your corner foundation principle must be DO RIGHT."

On Monday morning, April 2, I was again summoned to Mr. Hume's office, and I opened the conversation, saying that I presumed he wished to see me in regard to the matter under discussion recently, and I stated to him that I had been to Spring Hill and had seen Mr. Branham and my father in regard to the matter, and had ascertained from them that a franchise had been finally granted to an Independent long-distance company.

Mr. Hume then offered the following suggestions: He said that he had heard all the papers granting this franchise had not been signed, and that if I would go out to Spring Hill and talk

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with my father and the Mayor and other Aldermen of the town board and prevent the signing of the franchise ordinance, I might retain my position with the company; otherwise I could not. I immediately told him that my father had acted as a free citizen and according to the dictates of his own conscience, and that, while I might have—as I had told him previously—had I

> "There has been no exception to the rule so far, that the man who DID RIGHT came up on his feet every time and made a success, and the man who DID WRONG would sooner or later, and has sooner or later, taken a plunge into a pit so deep, and into an abyss so dark, that, as far as my knowledge goes, he has gone beyond redemption."

known of the matter before it was acted upon—expressed my views to my father, I had learned two days previously that a right of way had been granted for a competing Independent long-distance line, and that I would not take any stand whatever to prevent them from getting a right of way through that or any other town. Mr. Hume replied that he did not want any one on the payroll of the Cumberland Telephone & Telegraph Company who believed in any form of competition whatsoever in

> "You cannot afford to be discharged by the Cumberland Telephone and Telegraph Company; its reputation for fair dealing is too well established."

the telephone business, and that I might prepare to quit their service, whereupon I walked out of his office and arranged my business in the department in which I had worked so as to leave the service.

Mr. Gardner, their electrical engineer, had stated to me that my work was entirely satisfactory.

I desire the foregoing statement to be considered as though made on oath by me.

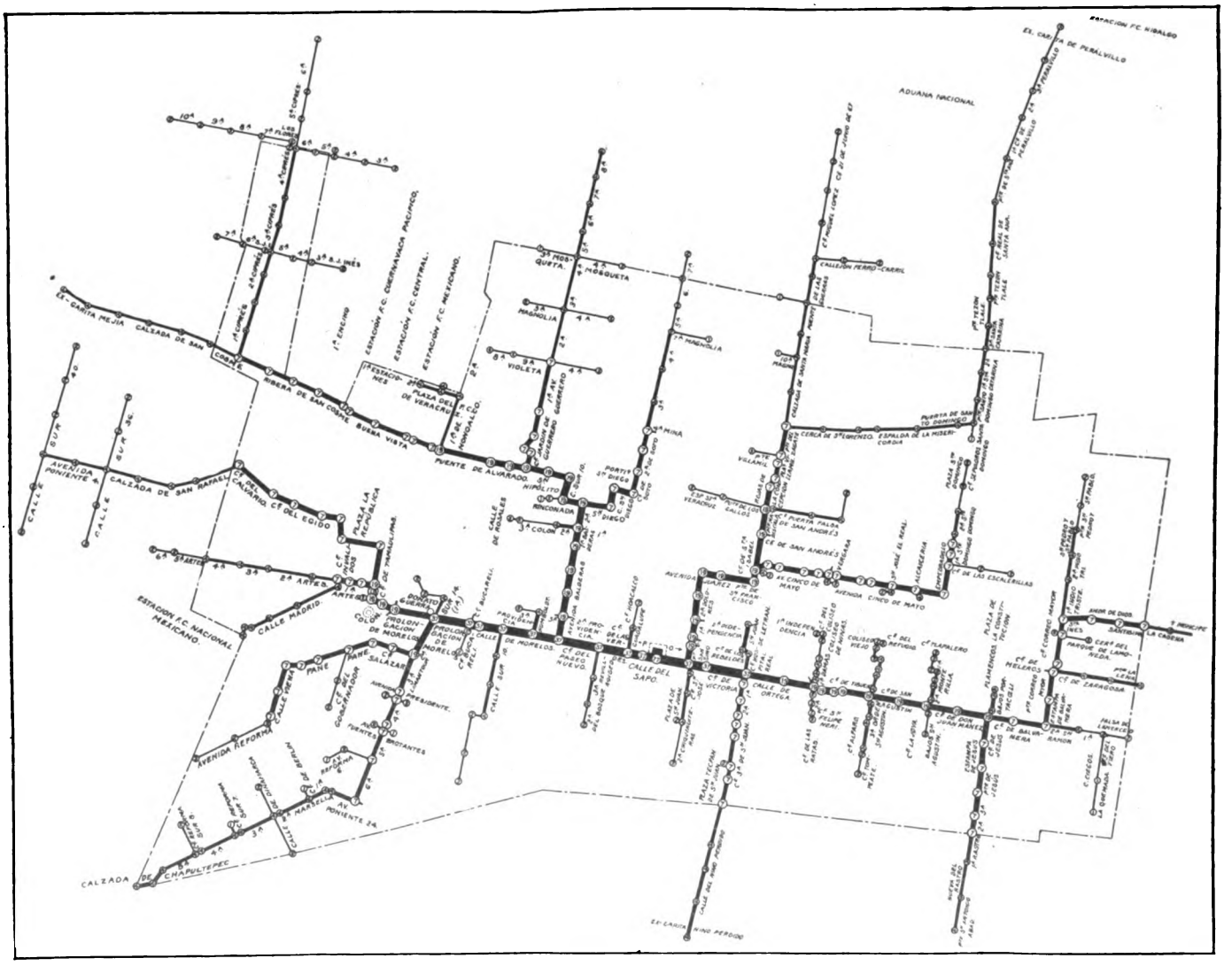
Thanking you for giving this matter space, I am very respectfully yours,

JAMES O. HARDIN, JR.,
1909 West Broad street, Nashville, Tenn.

Progress on Mexico's Independent System

BY "NOLEYE."

IN the City of Mexico the sub-soil is of such a nature as to offer the greatest variety of obstacles to the laying of the underground conduit plant now being installed by L. M. Ericsson & Company, who control the Independent system.


ADUANA NACIONAL
CALZADA DE SAN CRISTOBAL
RIBERA DE SAN COSME
BUENA VISTA
PUENTE DE ALVARADO
AVENIDA PONIENTE 4
CALZADA DE SAN RAFAEL
CALLE MADRID
AVENIDA REFORMA
CALZADA DE CHAPULTEPEC
CALLE DEL SAPO
AVENIDA CINCO DE MAYO
CALLE DE VICTORIA
CALLE DE ORTEGA
CALLE DE ZARAGOZA
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the large 37-way pipes had to be laid, was not an easy task, partly on account of the many obstacles encountered in the way of sewer and water pipes and three different systems of electric light cables, but principally on account of seepage water, which is encountered in some parts at three feet below the surface. Nevertheless, there have been laid 15 kilometers of ducts of all kinds, representing over 400,000 duct-feet of conduit and about 200 manholes, most of them made of concrete after the Moscow and Warsaw patterns, which are greatly admired by American and English engineers who have had occasion to see them and study their advantages here.

The greater part of the large cables have already arrived, and are now stored in the city, and the engineers are only waiting to clear up the debris in and around the central building to commence laying them. There are 600, 300 and 100 pair types, and thanks to the system of distribution which the company has adopted and found so practicable in Russia, there will be very little waste in the way of dead or reserve lines, which generally eats up a large part of the capital, without remuneration to the investor, in many underground telephone systems.

A glance at the accompanying plan will show that the laying-out of the system was well studied and that there was no wild rush and senseless jumping around from one street to another or—what is so common in ordinary underground work—"doubling-back" and crossing of one's own routes, which is a useless expenditure and consequently waste.

With the system branching out as it does, it is possible to reach every block within the limits of the underground construction and distribute subscribers' lines within each block either by means of inside cables or by aerial lines, without crossing a single street.

There will be only one central in the city proper; of the suburban towns each will have its own branch office, connected to the main office by underground trunk lines. Only beyond these branch offices will the overhead lines begin, for which purpose 6,000 poles are already at hand, having been cut specially, and imported from Norway.

Phosphor bronze wire and porcelain insulators will be used exclusively for these lines. Nothing but metallic circuits will be tolerated in the whole system, and these, in connection with the long distance instruments which will be installed, ought to give Mexico as good a telephone service as there is anywhere in the world.

The "Independent" interest will have another important ally in this company and one who is not afraid to measure its arms against the "Bell" monopoly as far as fighting spirit and quality is concerned.

Since the new system has been started here, the Bell has begun to make some feeble show of reconstructing its tumble-down system too, and is laying down underground ducts in some of the streets; but it is not at all likely that its 1,500 subscribers, who have been fed on promises for years, and who have spontaneously signed contracts with the Independent company, will keep their instruments many days after the new central office is open. They are simply tolerating the Bell instrument until the Independent company is ready to give them service, and thousands of people who have no telephone at present or have thrown out the Bell in course of many years on account of bad service are waiting for the coming of the new exchange with impatience.

At all events the company has come to stay here and fight the Bell and hopes to raise the "Independent" flag on that battered fortress.

WHY INDEPENDENT COMPANIES SUCCEED—AN EXAMPLE FROM TEXAS.

DESTRUCTION of property is no insurmountable obstacle to the Independent manager who is capable of making instantaneous use of all the resources available. This was most strikingly brought out by the rapid reconstruction of the plants of the Texas Telephone Company, of Waco, in two separate towns after disastrous fires.

On December 23, there was a fire in Clifton, Texas, that wiped out the entire business portion of the town, including the building occupied by both the Bell and the Independent companies.

The morning after the fire the manager of the Bell company made a Paul Revere ride across the muddy prairie and up the Bosque Valley, while Mr. J. B. Earle, the Independent general manager, sat in his office with a blue print of the town and a stenographer, dictating orders for new material, including poles, cables and an entire inside equipment.

On the morning of the 26th, three days after the fire, the Independent company's material was on the ground and in six days the exchange of one hundred and twenty-five telephones was working. In order to make this splendid record the company had built a temporary exchange building in the street at the corner where the new exchange was to be permanently located. The Bell company succeeded in getting its thirty-four telephones in position in twenty-nine days.

An even more remarkable record was recently made at McGregor, where the Brazos Valley exchange of three hundred and twelve telephones was burned on the night of February 6. Mr. Davidson, the company's superintendent, was in McGregor at the time, and rang up headquarters at 11:40, stating that the exchange building was on fire, and would be a total loss. Without waiting for further details, specifications for a new central energy switchboard of four hundred line capacity were immediately telegraphed to the manufacturer with instructions to spare no expense in giving the quickest possible delivery.

Cable was at once procured to rebuild the business portion of the town, putting one block of underground to office in four hundred pair cable, which had to be shipped from the manufacturer. The entire equipment of cable, switchboard, power board, terminal facilities, etc., were ordered, received and installed by the 21st, or just fifteen days from the date of the fire. This extraordinary record was due to the fact that the board was built by relays of men working day and night, and the entire apparatus, filling almost one-half car, came by express. As a result, the people at McGregor are stauncher friends of the Independent company if possible than before the fire.

The Bell employees were up before working hours the morning after the fire, each with his arms full of telephones, trying to place them with the Independent subscribers, assuring the people that it would take sixty days to rebuild the exchange.

As a result of the fire, the Independent company lost one subscriber and gained fourteen. Many subscribers went to the company's local manager immediately and asked to settle their bills, assuring him that they would not only wait for the exchange to be rebuilt, but would ask no rebate for the time the exchange was out of service. The company regards this as a most pleasing proof of the appreciation of the Texas people toward a company which came to their relief and gave them good service at reasonable rates and developed a rural business to the fullest possible extent, where before its arrival, telephone lines were not thought of.

BELL BEATEN IN WESTERN NEW YORK.

INDEPENDENTS in Northern and Western New York are watching with much interest a losing fight which the Bell is waging with the Independent company at Rushford.

This concern, which started in a very small way in 1898, has been growing very rapidly. In 1904 the capital stock was increased to $7,000 and a sub-licensee contract was entered into with the Bell. The results were disastrous and the directors made all haste to sever connections with the Bell company at the expiration of their term in 1905 and joined the Independent ranks. Immediately the usual Bell tactics were adopted; free service and other well known baits being offered, but the efforts have so far been a dismal failure. The Independent company, on the other hand, has been growing rapidly, and is in direct toll connection with all towns and cities in Western New York, including Buffalo.

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THE EDITOR'S PAGE

THE INDISPENSABLE TELEPHONE.

THERE is being told a story of an amusing instance of conversion to the telephone habit which well illustrates the point that the instrument is demonstrating its value in the country on an even more extensive scale than is occurring in the cities. A certain farmer was convinced that the advantage of being able to communicate with the town which furnished him at once with supplies and a market for his products was one worth the expense. His wife, however, objected to the interruption of her duties which would be caused by the repeated answering of calls and the frequent jangling of the bells on a party line. So the two agreed that, as it was a business proposition, the instrument should be installed at the entrance to the hen house, where the farmer spent most of his time. The social advantages of the instrument soon made themselves evident, however, and the stable seemed to be the proper location, as a point half way between, from which the men could call either person. From this but a single step was required to put the instrument completely in favor with the wife, to whom repeated saving of steps had made it a most grateful aid, and we see the instrument at last triumphantly installed in the kitchen to ring at will.

Aside from its uses as an aid to the transaction of business and a producer of profits, the telephone on a rural line is a much appreciated convenience to those members of a family who are prevented by the poor facilities for transportation from frequently enjoying the society of their neighbors. In the evenings whole communities are brought together upon the useful party lines, to listen to graphophone concerts, and talks are held in which all participate. Not only does it bring together neighbors who would otherwise, perhaps, become little acquainted with one another, on account of the comparatively wide separation of their homes, but it permits members of a family to remain as closely united as if they were all dwelling beneath the same roof. Co-operation in work is brought about at times when it is most needed. The distribution of labor, which is so serious a problem in places where the number of men is too great very often for economy during the dull season, when there is little work, and far too low at the busy season, is equalized by this system of communication, which makes it easy to locate each of the men available at the place where the necessity is. Hardly a week goes by without some public notification of an instance where a telephone has saved property from fire or other disasters.

Uses of the rural line are constantly being extended and systematized. The government weather service is being greatly increased in value through the co-operation of the telephone companies. On a great number of lines throughout the country, at the present time, at a designated hour in the morning, a general signal is given on the lines. This is known as the weather call and every farmer goes to his telephone and receives the prediction for the coming day. The plan has passed the experimental stage, and as the Weather Bureau is endeavoring to secure the co-operation of the greatest possible number of telephone companies it is likely that the benefits of this regular service will soon be available to all rural line subscribers. Plans for a regular news service over the telephone lines in many sections of the country are already well under way. In this way the isolated telephone subscriber is able to keep in touch at once with those near at hand and with all the outside circumstances which are capable of affecting his affairs in any way.

The increase of comfort and pleasure in the lives of those who are most widely separated from their neighbors is undoubtedly due in no small degree to the almost universal use of the telephone.

A VALUABLE DEMONSTRATION.

THE increase in the number of telephones in individual business establishments is progressing at a rate which causes the use of systems of this class to influence further development to an extent which is hardly capable of being realized. Formerly only the heads of firms of considerable size were accustomed to use the telephone from their desks. In these cases the instrument was regarded rather as a means of administering to the personal convenience of the user than as an essential provision for the carrying on of his business. Now there are few establishments indeed which would not rather do away with the services of a considerable number of clerks than to give up their telephones.

The modern policy of concentration of important affairs under the control of a comparatively few highly trained members of the organization brings about the necessity for speedy communication. Such men are able to give instantaneous decisions concerning many of the affairs upon which they must pass. By the use of the telephone they eliminate delay from waiting for conferences, and other causes, and are enabled to greatly increase the amount of business which they can handle in a single day. The telephone has been the subject of careful consideration along lines which determine absolutely its value in an organization and has "proved in."

The use of this method of communication in business hours by many employees has been most valuable from the standpoint of educational influence. It has led many members of the force in every place where large interior systems, or numerous lines are in use, to acquire the telephone habit.

Thoughtful men are growing more and more to appreciate the necessity of eliminating waste. Our large manufacturers now derive their principal profits from articles which a few years ago were thrown away. Meat packing houses are believed to have received their first start toward the development of a very profitable industry through preparing for sale the material which a few years ago was cast into the Chicago sewers. Chemical engineers are familiar with many instances where the introduction of a method for working over a waste product into a salable form has in a very few months put an unsuccessful business upon a most substantial paying basis. Such a course the reasoning man of modern business training applies to his own life. To accomplish the highest results in the limited number of years which are given him he must make each day count to the utmost. His time must be employed in such a way as to produce valuable results in either business or pleasure. It is the elimination of the actions which take time without giving a reasonable return that enable him to derive the highest profit from his business, and the most perfect enjoyment of his leisure hours.

One of the principal ways in which time is lost is by moving from place to place. It is in the business establishments that the average man is first brought to a realization of this truth, through observing the practical results and economies effected by the use of the telephone. This is one of the reasons why the building up of the residence telephone list follows the installation of the business instruments, slowly perhaps, but with absolute certainty.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

JOINT LIABILITY FOR INJURY FROM FALLING INSULATOR.

In THE AMERICAN TELEPHONE JOURNAL for March 24, 1906, in answer to a question by "R. F." you state that the telegraph company might also be liable, referring to the case of Quill v. Empire State Tel. & Tel. Co., 34 N. Y. S., 470, 37 N. Y. S. 1149. That case was reversed by the Court of Appeals sec 159 N. Y. S. 1, 53 N. E. 679, 6 Am. Elec. Cas. 303. Your statement seems, therefore, to be very misleading.

The query above mentioned is as follows:

An insulator improperly adjusted fell and injured a man passing below. We erected and were maintaining the pole, but the crossarm from which the insulator fell was occupied by the wires of a telegraph company under contract with our company. Are we liable under these circumstances?

IT is true that the case cited in answering this query was afterwards reversed; but it was on the ground that the defendant was not liable because "a city employee, having no relation whatever to any of the corporations owning or using the pole, went upon it for the purpose of making some temporary alteration in the position of the wires, and in attempting to do so lifted directly upward a wire that rested against one of the pins, and which caught upon the glass insulator, raised it up from the pin and threw it to the ground." No such facts appear in the question asked, and the editor assumed that the interrogator was responsible for the improper adjustment.

The opinion adds, "Nor is it (the telephone company) responsible for every act done or omitted on the lower arm of the pole, simply because it owns it." The editor said, "The telegraph company *might* also be liable," because the circumstances were not so fully stated in the query as to enable him to determine as to whether it was actually liable. A case may be valuable for practice and as an illustration, although afterwards reversed. We are glad to have the reversal called to our attention and cheerfully accept the correction.

TELEPHONE COMPANY NOT HELD LIABLE FOR $5,000,000 BACK TAX.

THE Circuit Court at Hopkinsville, Ky., has passed upon the the suit of Frank A. Lucas, revenue agent for the city at large, against the Cumberland Telephone & Telegraph Company, in which the plaintiff sought to collect five years' back tax on $5,000,000 worth of property alleged to have been omitted from assessment. The court sustained the demurrer of the telephone company, holding that the property of the company sought to be assessed was not liable for state and county taxes, as the notes, bonds, etc., held by said company had already been assessed by the State Board of Valuation and Assessment, or should have been. An appeal will be taken.

APPLICATION FOR REBATE DENIED.

COUNSEL representing The Hudson River Telephone Company, at a Special Term of the Supreme Court at Albany, N. Y., made an application for judgment in proceedings to review the assessments against it under the franchise tax act. It was alleged that the assessment against the company's property at Troy was made at full value, while other property is assessed at seventy-nine per cent of its value. The company has paid the tax and the application asked for a rebate of $225.84.

The Assistant Corporation Counsel appeared in behalf of the city of Troy and objected to the order on the ground that the city of Troy had not been made a party to the proceeding and that a judgment could not be entered directing the city of Troy to pay back the alleged overpayment until the city should have a chance to contest the alleged inequality of the assessment; in other words, that a judgment would not be entered against the city of Troy until it has its day in court. Justice Fitts held the point well taken and denied the motion.

RIGHT OF ABUTTING OWNERS TO COMPENSATION IN TENNESSEE.

THE question of whether telephone poles and wires erected in the street constitute an additional burden upon the fee of abutting owners for which they are entitled to compensation, has recently been decided for the first time in Tennessee. The facts in the case show that S. J. A. Frazier and wife platted some land opposite Chattanooga, and called it "Frazier's Addition." They retained the fee to the land covered by the streets, and simply dedicated them to the public use as a way of travel. The telephone company planted its poles on the land in front of complainants' property, rigged them with wires and used them in the operation of its business. Section 1830 of Shannon's Code, being the state law, provided that telephone companies may construct and maintain lines over the public highways and streets of the state. On behalf of the complainant it was contended that a proper street purpose can only be something connected with the use of the street as a passage way for moving objects, people, animals and vehicles, or with the maintenance of ingress and egress to and from the houses upon the street and the passage of light and air, and that therefore the use of a street for telephone poles is not a proper one. On the other side it was said that in the most correct sense a street is a means of intercommunication between the people of a city, and that the telephone is therefore but an improved method of subjecting the streets of a city to an old use, and that poles and wires are necessary adjuncts thereto. The court held that the telephone poles were not an additional servitude upon the land, and that the complainants were not entitled to compensation for the use of the streets by the telephone company. Frazier v. East Tenn. Tel. Co., 90 S. W. 620.

CENTRAL UNION CONFRONTED WITH AN ULTIMATUM FROM THE CITY OF ROCK ISLAND.

ROCK ISLAND, Ill., has brought its long existing fight with the Central Union Telephone Company, involving the constitutionality of its franchise there, to a crisis by the adoption in the council of a resolution ordering the company to accept its franchise under penalty of having its poles chopped down and wires cut. The company demurred at clauses in the ordinance providing for maximum rates, franchise taxation and the recognition of union labor. The city claims the company has no franchise to operate within its limits, and some time ago commenced chopping down the poles. The company proposed a compromise, but on protests of the Retail Merchants' Association the council issued this ultimatum.

CUTTING WIRES THAT INTERFERE WITH FLAG NO CRIME.

ON Lincoln's birthday four wires belonging to the Fairfax Telephone Company at Redwood Falls, Minn., were cut by a man who gave as his reason that they interfered with the floating of the United States flag upon holidays when the wind blew from the north. He was arrested for malicious destruction of property and upon trial was acquitted, the defense being that the wires were in position without authority and the company had not shown ownership of them.

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IN THE OPERATING FIELD

BELL COMPANY LOSING GROUND IN NEW YORK STATE.

WITH the signing of a contract between the Inter-Ocean Telephone Company and the Freeville Telephone Company practically the entire suburban and rural systems of Tompkins county, New York, are affiliated with the Independent interests.

The Freeville company recently cancelled its sub-license contract with the Bell and returned the leased transmitters and receivers. New equipment, including a switchboard, was installed and the business resumed.

Desertions from the ranks of the Bell company have been very frequent of late, the small companies appreciating the benefits to be derived from connection with the Independent lines. Not the least of these is the very complete toll and long distance service which reaches many small points not touched by the Bell lines.

MAYOR OF SAN FRANCISCO SIGNS ORDINANCE FOR SALE OF TELEPHONE FRANCHISE.

AN act of great importance to Independent interests in the Western States was recently consummated when Mayor Schmitz, of San Francisco, Cal., signed an ordinance authorizing the sale of a franchise for a telephone system.

The sale will take place on April 23. In so far as the towns on the Pacific coast are concerned the granting of an Independent franchise will mean a rapid development of long distance lines, as the large business with San Francisco will enable extensions to be profitably made from numerous rapidly growing systems in the less important cities.

TRI-COUNTY TELEPHONE COMPANY OF ILLINOIS TO EXPAND.

STOCKHOLDERS of the Tri-County Telephone Company of Illinois recently passed a resolution at the annual meeting raising the capital stock from $25,000 to $50,000 and also decided to move the principal office from Tamaroa to Mt. Vernon. A decision was also made to transfer the franchises and lines in Perry and Franklin counties to the respective stockholders in each. This was done to further the interests of the stockholders residing in these counties and will result in direct control of the county systems by local parties.

Franklin County, which has 2,000 instruments in service, will at once start an aggressive campaign for business and will build new lines and reconstruct others. The system in Perry County will be known as the Tamaroa Telephone Company.

Long distance lines are to be built by the Tri-County Company to connect all the towns together and to enable the subscribers to communicate with points in the adjacent territory. This company, which started business about eight years ago with ten telephones, now has over five thousand subscribers and connects with many of the Independent systems in Southern Illinois. The officers of the company are J. T. Payne, of Jefferson county, president, and A. Wolf, Mt. Vernon, secretary.

BELL PRACTICE OF GRANTING FAVORS ONLY WHEN OPPOSITION APPEARS CONDEMNED BY NEW JERSEY PAPER.

COMMENTING upon the attitude of some members of the Hammonton Town Council, the *South Jersey Republican* very clearly indicates its belief that the Delaware and Atlantic company should receive no favors from the city. In the course of the article a review of the Bell methods is given in which it is shown that prior to the organization of the Hammonton Telegraph and Telephone Company the Bell refused to do anything for the betterment of its local service and only came to the city because it was the most convenient route by which its lines could be carried to Atlantic City. Now, finding that the Independent company is getting the lion's share of the business, it is offering every inducement and has applied for an amendment to its franchise.

The Hammonton company, which has just started in business, has already secured one hundred and twenty-five subscribers which are listed in the directory. The officers are A. J. Rider, president; M. L. Jackson, vice-president; S. Anderson, treasurer, and L. F. Horne, secretary.

MICHIGAN ASSOCIATION HOLDS ANNUAL CONVENTION.

OVER one hundred and fifty men prominent in the Independent field of Michigan attended the ninth annual convention of the State Association, held at Ann Arbor on March 22-23. The convention was called to order on the afternoon of the 23d by President E. B. Fisher, of the Citizens' Telephone Company, Grand Rapids, who in a very interesting way welcomed the delegates and outlined the purposes and work of the association. The balance of the afternoon was given up to a number of addresses by prominent Independents. R. E. Hamblin, of Toledo, Ohio, spoke at length upon the favorable conditions in Northwestern Ohio. C. B. King, manager for the local company, selected as his topic a talk concerning competition. During the course of his speech he referred to the opposition of the Bell and very clearly demonstrated that the Independents were able to hold their own.

"Progress and Prospect" formed the subject of some remarks by W. O. Hunt, of Adrian. The growth of the Michigan Independent system was outlined and the speaker phophesied that within a short while the entire State will be covered by a complete network of Independent lines.

W. S. Vivian's paper upon the progress of the traffic association brought forth a lively discussion as to whether the sending or receiving company should check the overtime charges on long distance calls. The majority appeared to favor delegating this work to the receiving office.

Other numbers on the programme were "Our Investments," by E. S. Wagar, of Edmon and "The Detroit Situation," by W. B. Woodbury, general manager of the Home Company of Detroit. Each of these speeches was listened to with a great deal of interest, as the subjects formed matters of prime importance to all the members who were present.

H. H. Hutchins sent a paper upon history, which was read, and F. V. Newman, manager of the Grand Rapids exchange, read a paper on "Crowding Collections," which aroused an exceptional amount of interest. Other papers presented were "The Cedar Supply," by H. P. Grover, which ably dealt with the lumber conditions; "The Outlook in Indiana," by W. L. Moellering, of Fort Wayne, and "Ohio's Successes," by Frank L. Beam, president of the Ohio Association. Information gained from these addresses showed the remarkable strength of the Independent movement which in the State of Indiana had been the means of the Bell's undoing, there being 190,000 Independent telephones to 35,000 Bell.

On Friday morning a gratifying report of the traffic association was read by its president, C. E. Tarte. The vice-presidents of the six districts next delivered their statements relative to the condition in their localities. Wm. Robinson, of Muskegon, treasurer of the association, presented his statement of the financial

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affairs and was followed by the report of the secretary, J. B. Ware. The next item on the programme was the election of officers, which resulted as follows: President, E. B. Fisher, Grand Rapids; secretary, J. B. Ware, Grand Rapids; treasurer, William Robinson, Muskegon; executive committee, J. H. Fildew, St. Johns; C. E. Tarte, Grand Rapids; W. B. Woodbury, Detroit; J. B. Ware, Grand Rapids; E. B. Fisher, Grand Rapids.

Delegates at large to the National-Interstate Convention, to be held in Chicago on June 27, 28, 29, were elected as follows: J. B. Ware, W. B. Woodbury and F. W. Howard. E. B. Fisher was selected as member of the executive committee of the National Association.

In every way the convention was a pronounced success, the members taking part in discussing the various papers with a great deal of enthusiasm. Inasmuch as many items of interest were brought forward, it is the unanimous opinion of the members that the future development of the Independent movement will be even more rapid than the past.

The meeting place of the next convention was not decided upon, but was left to the discretion of the president and executive committee, who will report later.

NEW COMPANY ORGANIZED AT EXETER, N. H., WHEN OLD ONE SELLS OUT.

ALTHOUGH the Exeter, N. H., Telephone Company has passed into the hands of parties affiliated with the New England (Bell) company, the town will not be long without Independent service. A new company, to be known as the People's Telephone Company of New Hampshire, has been organized. The incorporators are Warren Brown, of Hampton Falls; Warren M. Batchelder, of Hampton; George A. Carlisle and Augustus Young, of Exeter, and Daniel J. Bakie, of Kingston. This company will construct an Independent system in Exeter and surrounding towns, franchises having been secured in Exeter, Kensington, East Kingston, Kingston and Hampton Falls.

More than 150 subscribers of the old Independent line have been pledged to the new company and many more will subscribe as soon as the company is in operation. It is understood that the work of construction will be started in the near future.

WOMEN INCREASE LAW AND ORDER VOTE BY TELEPHONE CAMPAIGN.

FEMININE voters in Topeka, Kas., employed the telephone to great advantage in a recent election. During the greater part of the campaign the weather had been too severe for the ladies to get out to work for their candidate and, appreciating the necessity of keeping in touch with the situation, they utilized the telephone to bring their arguments before doubtful voters. On the day of election the operators at the exchange were kept busy by calls from the feminine population, who worked from the opening to the close of the polls to get their friends to face the inclement weather and vote for their candidate.

So successful were they that very few of the women stayed away and consequently a heavy vote was polled in favor of the movement which they favored.

REMARKABLE GROWTH OF A MUTUAL COMPANY IN OHIO.

FROM a start with fifteen subscribers on March 19, 1903, the plant of the Mercer County, Ohio, Mutual Telephone Company has grown to its present size with over 800 subscribers receiving service.

At the annual meeting held in Celina on March 14 President Kraner outlined the history of the company. The idea of a mutual company originated with him in December, 1902. On January 3, 1903, a meeting was held as a result of a call sent out by Mr. Kraner, J. L. Monow and J. A. Wilson to consider the organization of a company. Hopewell township was first organized two weeks after the subject was broached and on the 29th of January line No. 1 was surveyed and staked. Development thereafter was very rapid and lines were built to connect with the Independent systems at Celina, Rockford and other towns in the county. In 1904 the company had established the Wabash division and was then in a position to give service to almost every point in the entire county. The money invested represents over $15,000, which was raised entirely by the subscribers.

At the meeting several hundred farmers were present who had direct interests in the company and many of whom had been patrons since the first lines were constructed.

Display Card Shown in Windows of Business Establishments in Niagara Falls, N. Y. Public Sentiment Is Strongly in Favor of the Niagara County Home Telephone Company, Which Is Giving Exceptionally Good Service.

SITUATION IN FRANKLIN COUNTY, OHIO, PROMISES RAPID INDEPENDENT GROWTH.

GANSEY R. JOHNSTON, general manager of the new Franklin County Telephone Company, has issued a statement to the stockholders and patrons of the line outlining the policy of the management in the near future.

Mr. Johnston states that the slowness of development in the county in the past few months has been due to the absorption of the energies of the officials of the various companies in the Independent improvements in Columbus, which have made it necessary to concentrate there all the labor available.

July 1, the total number of telephones on the fourteen Franklin County exchanges was 1,600. On the 1st of January this year the number, in spite of the work in Columbus, had risen to 1,741, and in the past two months over 300 more have been added. Increased switchboard facilities are needed at Canal Winchester, Worthington and Westerville, and the boards have been ordered. Two carloads of wire, almost 350 miles, have been shipped to various points in the county, and will soon be in use. Cable work will be under way within a short time in Worthington, Westerville, Groveport and Grove City and additional toll lines will be built between Harrisburg and Columbus, Canal Winchester and Pickerington, and Dublin and Worthington while additional operators have been put to work at Canal Winchester.

The growth of the system in Columbus has been at the rate of 125 telephones a week and the operating force has been doubled.

KANSAS MUTUAL COMPANY REPORTS GOOD PROGRESS.

ABOUT three hundred and fifty delegates recently met in Columbus, Kansas, at the convention of the Cherokee County Mutual Telephone Company.

M. A. Householder, secretary of the company, delivered a report of the company's condition, which showed a steady growth of the business. Upwards of 750 telephones are now in service in the county and free interchange of service is given with several other exchanges. During the past year the toll lines have been greatly extended and direct service is now given to Melrose, Baxter Springs, Hallowell, Sherwin Junction, McCune, Oswego, Weir, Crestline and Sherman City. Besides new toll lines to be constructed a large number of local lines are being organized which will extend the service to almost every point in the county.

The officers elected are: Wm. Shaffer, president; Emerson Hull, treasurer, and M. A. Householder, secretary.

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QUERIES

BREAKING OF A COPPER LINE.—(684.)

Last summer our company put up a new copper wire line. With the approach of cold weather considerable trouble was experienced with the wire breaking, and we had to frequently send a man out over the line, the breaking usually being found due to poor joints. We thought that it was due to defects in the wire; but later in the winter we had much colder weather, and a sleet storm, which put a heavy strain upon the line, and during this time there was not nearly so much trouble caused as during the earlier part of the winter when the stress on the wires was only moderate. Can you account for this? R. P. F.

The trouble with your line is no doubt due rather to careless workmanship in splicing than to any defect of wires. If the skin of a hard drawn copper wire is broken, even to the slightest degree, the strength of the material is substantially weakened at this point, and any undue stress will cause it to break. Throughout the summer the lines were subject to practically no greater tension at one time than another, and no breakage was to be feared. The arrival of cold weather, however, caused them to contract and increased the tension, and this resulted in the breaking of the wires at all weak points. It is probable that the first cold weather picked out all such places along the line, and your repairs were probably so carefully made that perfect joints were obtained. This would account for the absence of the trouble in the more severe weather which occurred later.

USE OF LAMPS AS RINGING INDICATORS.—(685.)

We have a Warner pole changer for ringing power giving 75 volts direct current at generator terminals. We now have an eighty ohm buzzer on each section for resistance. We want to put in lamps for this resistance. What candle power and voltage for the alternating current would you advise and what make of lamp and sockets? What candle power and voltage for positive and negative current? We use 80 ohm, 1,600 ohm series and bridging and 2,500 ohm bells for selective ringing. Lines are from 2 to 9 miles long. We wish the light to burn so that the operator can see if lines are working. Generator lead is 50 ft. long, of No. 12 copper wire. B. T. Co.

The plan you propose is not feasible, as the amount of current which will be available for lighting the lamps when ringing these high resistance ringers will not be sufficient to even heat the lamp filament enough to make it red.

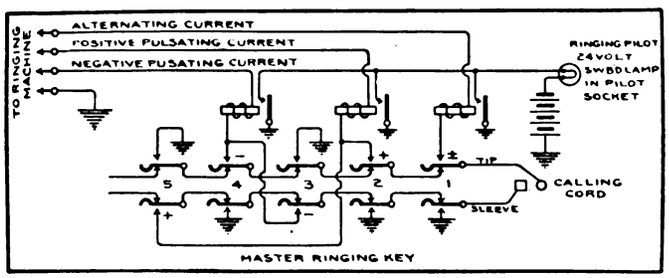

Fig. 685.

You could substitute low impedance alternating current relays in place of the buzzers and connect their contacts to pilot lamp, which can be made to operate from a local battery. This scheme is shown in Fig. 685. It would be necessary to provide one relay for each of the power leads, i. e., one for the alternating, one for the positive pulsating and one for the negative pulsating currents. A common lamp could be used for a pilot, or if desired one lamp for each relay. Of course, it would be necessary to have a complete set of relays and the necessary pilot lamp at each operator's position in order to make your plan effective.

CALL WIRE TRUNK.—(686.)

I should like to have you explain the nature of a "call wire trunk." L. R. G.

A call wire trunk consists of a line terminating in a multiple jack at a subscribers' or toll operator's position or a desk, and in a cord and plug at an incoming trunk operator's position. Such a line is used for the transferring of connections which originate at the first position and terminate on a line multipled at the incoming trunk position. It derives its name from the fact that instead of having a calling-in signal associated with the line itself, it is operated by directions given over a call wire, or order wire. For instance, a trunk operator may have at her table ten incoming call wire trunks from a given office terminating in plugs, and numbered from 10 to 19. At the other office these lines terminate in the multiple jacks in front of the subscribers' operators. Assuming that a subscribers' operator receives a call from line 401 in her own exchange for number 127 at the distant office, she will depress the key which puts her in communication with the trunk operator at that office, over the order wire, and say "127." The trunk operator will immediately give the number of the trunk, as "15," the assignment being transmitted back to the original office over the call wire. The trunk operator inserts her plug into multiple jack No. 127, and the subscribers' operator inserts her calling plug into trunk multiple jack No. 15, her answering plug being connected to the line of the subscriber desiring the connection. The connection between the lines being thus established some one from the considerable number of plans which have been invented is employed to ring the desired subscriber. On completion of the conversation a disconnect signal is given to the office originating the call. Disconnection here causes the appearance of a disconnect signal at the incoming trunk position. It will be evident that no portion of the trunk circuit is in use for either talking or signalling until all the details of the connection are determined, and this is the essential feature of a call wire trunk.

ORDER WIRE.—(687.)

Will you please tell me exactly what is meant by an order wire, and where and how it is used in exchange operating? L. R. G.

An order wire circuit consists of a pair of wires leading from the secondary, or receiver circuit of an operator's telephone set, to which they are permanently connected, to one set of springs on a key located at the position of a distant operator. By means of this key the second operator can at will connect her talking circuit to the order wire for such communication as may be necessary. The object of this arrangement is to enable the operator at whose set the circuit terminates to be reached instantly for the purpose of receiving instructions, which would be impossible if it were necessary for her to go through the regular process of answering a signal.

The principal use of this arrangement is for communication between a subscribers' operator or a toll operator and an operator at an incoming trunk position. The method in which the call wire is used in this connection has been explained in connection with your query, No. 686. For this purpose it is customary to multiple the call wires at all of the subscribers' or toll operators' positions. A call wire is frequently used between the chief operator's or information operator's desk and the switchboard position at which special trunks from the desk are terminated; also between the test set and a special position at the switchboard when the arrangement is such that lines are connected to the testing apparatus by means of special cords inserted in the multiple jacks. In every case the call wire is used as a means of direct communication between one employee of the telephone company and another, as a means of directing the movement of apparatus connected to other circuits.

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WANTED—First-class automatic telephone and switchboard man. Position permanent. Address, stating prior employment, with references, Home Telephone Co., Santa Monica, California. 594

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TELEPHONE PATENTS

TELEPHONE ATTACHMENT.

Joseph Silverman, San Francisco, Cal., patents (No. 815,753; dated March 20, 1906; filed November 23, 1905; serial No. 288,703) a telephone attachment.

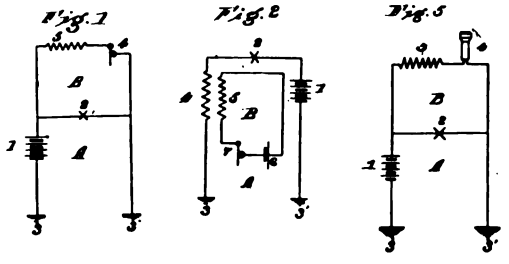
The object of this invention is to provide means for supporting the receiver of a telephone so that the hands may be left free. This the inventor accomplishes by means of a specially designed bracket supported on a rod and so adjusted as to be moved to either right or left of the transmitter. To this bracket the receiver is attached. In place of the usual receiver hook a lever is substituted which by means of suitable gear can be operated by hand to close the circuit, which remains in that condition until released by an opposite movement.

WIRELESS TELEPHONY.

A. F. Collins, New York, N. Y., patents (No. 814,942; dated March 13, 1906; filed August 21, 1905; serial No. 275,026) a system of wireless telephony.

The object of this invention is to provide a means whereby the transmitter and receiver of a wireless circuit can operate and be operated independently of the current traversing the earth or other medium.

To accomplish these results the inventor shows several circuits



of which some are suitable for transmitting and the others for receiving.

The method of transmitting substantially consists in modifying a current of sufficient force to produce an arc light, by means of either shunting the current as shown in Fig. 1 or superimposing a direct or alternating current on the circuit including the arc light as shown in Fig. 2. In Fig 1 *A* is what may be designated the heavy current circuit, and includes the arc lamp 2, source of current 1, and terminals 3, 3^1 forming connection with the earth or other medium. Circuit *B* is in parallel with the arc light, and includes a resistance 5 to protect transmitter 4. Any variation in the circuit *B* due to the action of the transmitter is impressed upon circuit *A*. The variation of the resistance of the arc produces electrical undulations in the earth circuit of much greater amplitude than those originated in circuit *B*. In Fig. 2 an alternating current is inductively created in the circuit *A* to accomplish the same results. Variations in circuit *B* are communicated to circuit *A* through the medium of the transformer coils 4, 5. The alternations thus set up in *B* serve to vary the resistance of the arc 2, with the final result that an alternating current having the same phase and frequency as that produced through the action of the transformer, but with greater amplitude, is made to pass through the earth or other medium in which the conductor terminals are imbedded.

The operation of receiving relies upon somewhat similar principles. Referring to Fig. 5, which shows the receiving circuit in its simplest form, the circuit *A* includes a source of electromotive force 1, and arc light 2, and conductor terminals 3, 3^1, imbedded in the earth. The circuit *B*, which is in parallel with the arc light, includes a receiver 4 and resistance 5. When in operation the function of this receiver is as follows: The electric pulsations received through the earth are superimposed upon the current flowing in the circuit *A*. These impulses vary the resistance of the arc 2 and increase the variations of the current from the generator 1 flowing through the circuits *A*, *B*. The receiver 4 in circuit *B* is protected from excessive voltage by resistance 5, but responds to changes in circuit *A* with augmented amplitude and intensity.

LIGHTNING ARRESTER.

Frank K. Singer, Wheeling, W. Va., patents (No. 814,482; dated March 6, 1906; filed April 17, 1905; serial No. 255,928) a lightning arrester.

This device is particularly designed for protecting telephone cables, but can be adapted for use elsewhere.

The essential feature consists of the insertion of a choke coil in series with the line fuse.

The fuse tube is made out of non-conducting material and around one end are wound about twenty turns of No. 22 insulated wire. One end of this wire connects to a line terminal; the other to a ribbon fuse which is enclosed within the tube. In conjunction with the fuse and choke coil a spark gap lightning arrester of conventional pattern is employed.

WIRE SPLICER.

Datus C. Smith, New York, N. Y., patents (No. 815,755; dated March 20, 1906; filed August 15, 1904; serial No. 220,838) a wire splicing tool.

The object of this invention is to provide improved means for splicing wires.

Referring to the illustrations *a* and *b* are two pivoted members, one of which *a* has a hook or bend *c*, and is provided with hooks or notches *d*. The other member *b* is so pivoted to *a* that its free end *e* can pass within the hook *c*. It is provided with a flange or stop *f* to limit the relative movement of the two members.

In operation the tool is opened, one of the wires *x* is placed within the hook *c* and locked by the closure of the member *b*,

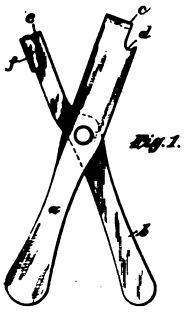


Fig. 1.

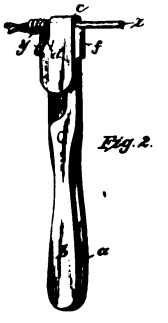


Fig. 2.

the end of the other wire *y* is then caught in one of the notches *d*. The portions of the wires towards *y* are then grasped by any suitable tool and the splicing device revolved, which causes the end of wire *y* to form a coil around *x*. The splice is completed by removing the tool and applying it to the wire *y* and free end of *x*.

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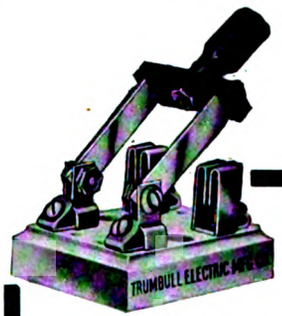

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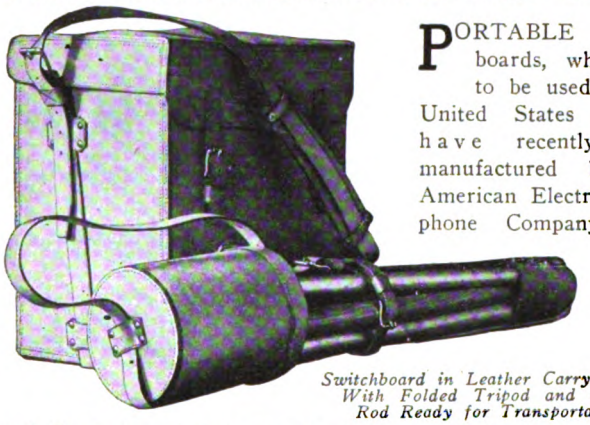
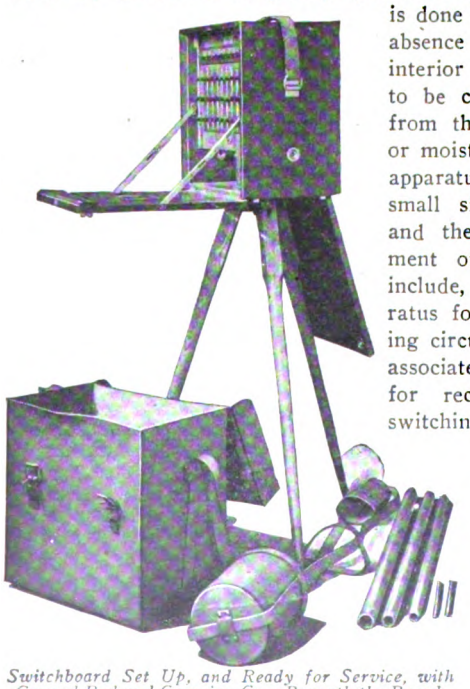


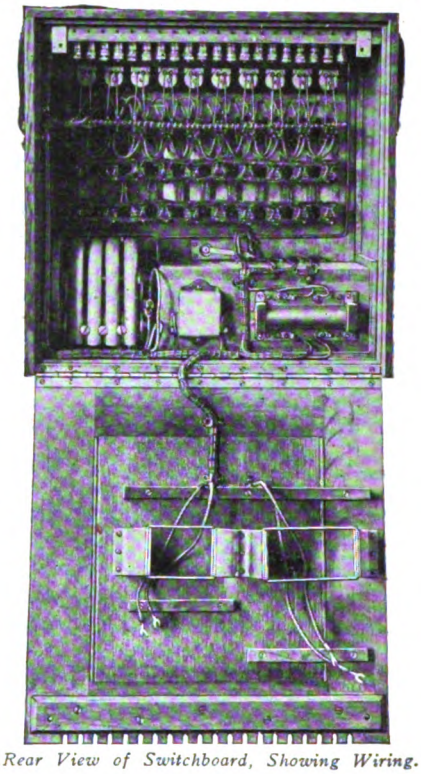
Switchboard in Leather Carrying Case, With Folded Tripod and Ground Rod Ready for Transportation.

PORTABLE switchboards, which are to be used by the United States Army have recently been manufactured by the American Electric Telephone Company, 64th and State streets, Chicago, Ill. That the exacting requirements of the Government for apparatus which shall fulfill in the highest degree the conditions for this difficult service, have been met by apparatus designed with much skill will be evident from the illustrations upon this page. The special nature of the work demanded of the switchboard makes it essential that it, and all of its apparatus, should possess to the utmost extent the qualities of durability, compactness, efficiency and reliability, and all this must be secured without the addition of the slightest weight beyond that essential for securing the necessary strength. These features have been combined in a special switchboard in a very interesting manner.

As a means for interconnecting lines, the designers found it advisable to use an arrangement of keys, with a special system of wiring, doing away completely with the use of cords. By this plan they secure the important advantage which comes from the ability to make a compact switchboard with no provision for the cord shelf; also the undesirable feature of cords which will be extremely difficult to keep in proper working order in the field is done away with; and the absence of jacks allows the interior of the switchboard to be completely protected from the entrance of dust or moisture, even when the apparatus is in use. The small size of the cabinet and the compact arrangement of its parts, which include, of course, apparatus for talking and ringing circuits, as well as that associated with each line for receiving calls and switching purposes, will be evident from an examination of the front and back views of the cabinet. It will be noted in the view of the face of the switchboard that there is a small opening in the lower left hand corner beneath the keys. This has been reserved for the operator's telephone set. The switchboard may be quickly unpacked from the neat and durable carrying case with which it is provided, and in a very few minutes it is ready for use at any desired location. A substantial tripod is used to elevate it to the height most convenient for manipulation. Where grounded lines are desirable, the sectional ground rod may have its parts screwed together, and be driven while the switchboard is being set up.

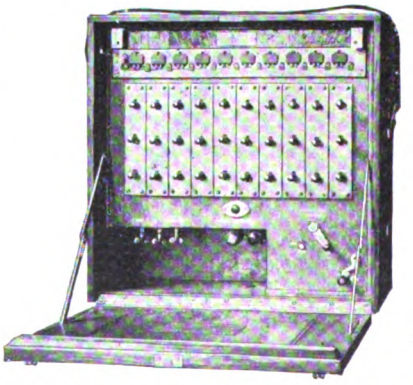


Switchboard Set Up, and Ready for Service, with Ground Rod and Carrying Case Beneath the Board.



Rear View of Switchboard, Showing Wiring.

It goes without saying that, in addition to the valuable features of general design, the individual pieces of apparatus which are included in this set conform to the highest standards, as they have successfully passed the rigid examination of the Government officials.



Front View of Switchboard Showing Keys and Drops.

THE AMERICAN AUTOMATIC TELEPHONE COMPANY, Rochester, N. Y., has leased 7,000 square feet in a new building and will begin the actual manufacturing of equipment about May 1st.

B. J. Williams, president of the Shelby, O., First National Bank, and treasurer of the company, has located in Rochester to take active participation in the company's progress. F. G. Dunham is factory superintendent. J. W. Lattig and C. L. Goodrum, the inventors of the apparatus, are taking an active interest in the development of the factory.

THE STAR ELECTRIC COMPANY, Niles, Ohio, is manufacturing a dry cell known as the Diamond S. This battery is designed for long life and has a guaranteed output of twelve amperes. Another type, the Diamond S S, is made in three sizes, 6, 7, 8, and is intended for use where higher amperage is necessary. The output

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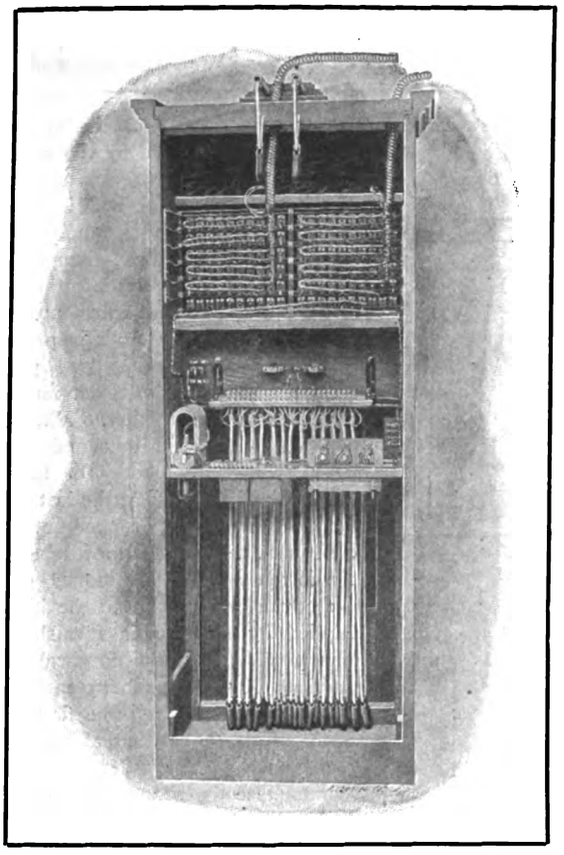

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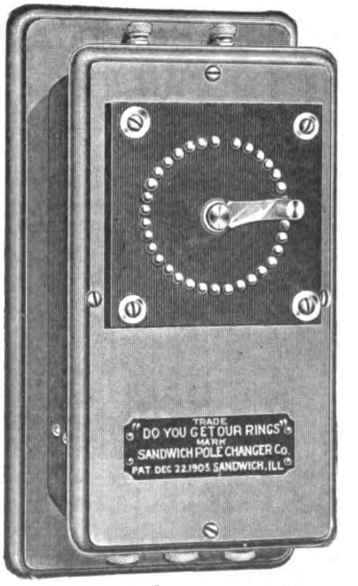

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of the different sizes is as follows: No. 6, 25 amperes; No. 7, 30 amperes; No. 8, 35 amperes. Quotations and further particulars will be furnished by the firm upon request.

A RECORDING PAY STATION.

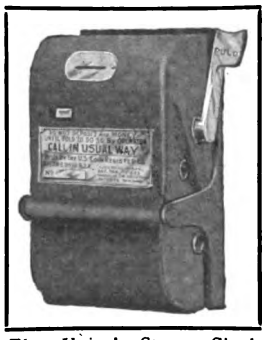
A PAY station which gives a positive and unmistakable signal to the operator, defies all attempts to beat its mechanism by plugging or working with strings or wires, and in addition prints a record of every coin received is what is claimed by the United States Coin Register Co. of Toledo, O.

The machines are provided with a chute which is constructed in a special manner designed to prevent the plugging up of the mechanism, or the working of it by means of a coin tied to a string, or a wire, or otherwise. When inserted into this chute the coin passes between a set of rollers, which are operated by the pulling of the lever. In this way the coin is forced through. During the operation a gong is struck to give the signal to the operator. The mechanism is so arranged that but one coin can pass through the rollers at a time, no matter how many may be inserted. In this way it is absolutely sure that the signal will be given to the operator for each coin.

In the three-slot machine there is provided a special slide which prevents the insertion of coins of more than one denomination at a time. When a five cent coin is put in the slot it is impossible at the same time to insert a ten cent coin, or a twenty-five cent coin, and this is true of all of the other slots. The signals are all given from one gong, one blow being struck for five cents, two for ten cents and five for twenty-five cents. In this way any possibility of the operators failing to distinguish between two different tones is avoided; all she need do is to count.

The entire mechanism is made in an extremely substantial manner. It is locked in a case apart from the money box, and cannot be tampered with by any unauthorized parties. The coin box is also separately locked, and cannot be opened by persons without the proper key. In this way absolute security against meddling with either the registering mechanism or the money compartment is assured.

Although the mechanism for receiving coins and giving signals presents many advantages of a most valuable and positive type, a feature which is designed to be of the greatest assistance in preventing annoyance and enabling telephone companies using this device to collect full returns for all messages, consists of a recording device which automatically registers the receipt of every deposit. This operates on the principle of making a mark upon an automatically unrolled tape for every five cent unit. As will be seen from the illustration, the tape is printed with figures numbered serially from 1 to 2,000, except that every tenth number is represented by a cross for convenience in counting. Also the number of the box is printed upon the tape at every twentieth number. This last feature prevents any juggling of tapes from different boxes by the collectors, with the object of defrauding the company. In operation each time the signal bell is struck the tape is unrolled, an amount corresponding to the space occupied by a single number passing into the cash box for each five cent coin deposited; at the same time a dash is printed, from a strip of carbonized paper, upon the back of the ticket immediately behind the number. When the collector visits the box and opens it to collect the money the tape is automatically cut off at the last number recorded, and dropped into the cash box. This piece of tape will show the amount of money which has been deposited, the total amount being equal to the highest number upon the tape multiplied by five. This furnishes an exact check, which should do away with any possibility of variation between the accounting and the receipts. The first piece of tape cut off is to be filed at the office, and held until the next collection. When the second piece is brought in its first number should be the one next above the highest number on the first tape, thus affording an absolutely infallible check on all receipts throughout the year. A single tape is good for the collection of $100.



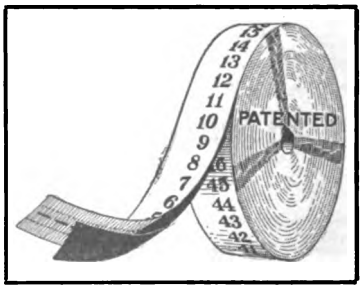
The United States Single Coin Pay Station.

A Complete and Convenient Recording Pay Station for Desks and Booths.

Aside from its use in preventing loss through the dishonesty of employees, or outsiders, the company offers the following suggestion to managers of exchanges which give measured service. In such places frequently complaints are received from subscribers, who claim that their bills call for payment for more conversations than they have actually had. By the use of this device the subscriber makes his own record every time he talks, and there can be no possibility of contesting the amount of the bill. The whole operation is practically automatic and infallibly correct. The U. S. Coin Registering Company believes it has solved the recording pay station problem in a manner which will be extremely satisfactory in operation, and invites every telephone manager to make the most careful investigation of its apparatus.

In the three slot instrument it is impossible to insert more than one coin at a time.

THE COLUMBIA ELECTRIC COMPANY, McCordsville, Ind., is developing a large business in its key and drop departments. These pieces of apparatus are made with the greatest care and are guaranteed to be satisfactory in every respect. All contacts are furnished with platinum points and the insulation employed is the best that can be procured. Its telephones are guaranteed for five years and it is claimed that they are able to withstand the hardest usage. All apparatus is carefully designed, made and inspected. Parties interested can secure further information by addressing the company.



Every Nickel Deposited is Recorded Upon This Tape.

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in Europe and America, **Avenarius Carbolineum has fully established its reputation as the most efficient wood preservative on the market.** From examinations of poles and ties set in the earth ten years ago, those treated with this preparation are in an excellent state of preservation; whilst those not so treated have nearly rotted away.

Avenarius Carbolineum effectually prevents dry and wet rot, or decay of any kind, and increases the life of poles at least three fold.

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Its boiling point being high, the inflammability of the timber is not increased.

Avenarius Carbolineum is guaranteed to protect under all conditions, and will be found upon trial to be the most economical aid in line construction ever known. Write for booklet and copies of testimonials from men who have been convinced.

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Do you realize what the use of good batteries means to your telephone system—even if you don't count the money they save?

HERE—

Good instruments, proper wiring, and good batteries make good service—good service means satisfied users and this means more subscribers.

Think it over. You'll lose ground if you use cheap batteries. Quality counts.

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General Offices, Rochester, N. Y.
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LOCUST PINS

in Buffalo Stock for IMMEDIATE SHIPMENT

100,000—1¼ x 8 selected
25,000—1¼ x 8 commercial
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also

Hickory Boiled in Paraffine

100,000—1¼ x 8 selected
Hickory boiled in paraffine

Hickory is as strong as Locust and the paraffine gives it the same life

Robertson Electric Co.
BUFFALO, N. Y.

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FINANCIAL.

NEW BRITAIN, CONN.—The Farmington Valley Telephone Company has declared a semi-annual dividend of 3 per cent. payable April 2.

ROUND KNOB, ILL.—The Massac County Telephone Company, Round Knob, has increased its capital stock from $2,490 to $4,980.

DANVILLE, IA.—The Mutual Telephone Company, of Danville, has increased its capital stock to $20,000.

FALL RIVER, MASS.—The Fall River Automatic Telephone Company has declared its quarterly dividend of 1 per cent.

MONROE CITY, MO.—The Farmers & Merchants' Telephone Company contemplates increasing its capital stock from $3,000 to $6,000.

HILTON, N. Y.—The Hilton Telephone Company has increased its capital stock from $8,000 to $15,000.

GRAND FORKS, N. D.—The Traill County Telephone Company is to increase its capital stock from $30,000 to $50,000.

FRANCHISES.

MARYSVILLE, CAL.—Frank W. Anderson, of Wheatland, has applied for a fifty year telephone franchise at Marysville.

FORT LAUDERDALE, FLA.—M. A. Marshall, of Fort Lauderdale, has been granted a franchise to construct a telephone line from Fort Lauderdale to Dania.

RUSSIAVILLE, IND.—Messrs. Evans and Jeter, Russiaville, have applied for a franchise to construct a telephone system in Honey Creek township.

HELENA, MONT.—W. H. Crumb has been granted a telephone franchise at Helena.

ASHLAND, N. H.—The Baker River Telephone Company has secured a franchise to construct a telephone system in Plymouth.

HASTINGS, OSWEGO CO., N. Y.—The Independent Telephone Company, of Syracuse, has applied for a franchise at Hastings.

COMBINATIONS.

DUNNELLON, FLA.—The East Florida Telephone Company has purchased the property of the Florida Tel. & Tel. Company, whose lines run from Dunnellon to Floral City.

MT. AUBURN, ILL.—The Mt. Auburn Independent Telephone Company, formerly owned by Messrs. Miller & Mulberry, has been acquired by J. H. Donaldson, of Taylorville.

WINCHESTER, IND.—The Branch Telephone Company has been taken over by the Eastern Independent Telephone Company, with headquarters in Winchester.

ACKLEY, IOWA.—The telephone exchange at Ackley, Iowa, has been sold by Bruening & Symington to a stock company, of which E. B. Smith, of Waterloo, is president, and F. J. Martin, of Ackley, is secretary.

LEWISTON, MICH.—The Montmorency Co. Telephone Company has acquired the telephone lines of Cauchon & Sons. The new company contemplates making many improvements in the system.

ELLENVILLE, N. Y.—The Beaverkill Telephone Company has been acquired by H. S. Wells, of Ellenville.

PRICE, UTAH.—The Eastern Utah Telephone Company is trying to obtain possession of the government telephone lines from Price to Myton.

ELECTIONS.

AUBURN, CAL.—The Placer County Telephone Company has elected the following officers: John A. Livingston, president; C. P. Huestis, vice president; G. Geraldson, secretary; A. R. Hall, treasurer.

BORDEN, IND.—The Overland Telephone Company, of Borden, has elected the following officers: Elmo Cauble, president; William Dietrich, secretary and treasurer.

CARLETON, MICH.—The People's Telephone Company, of Wayne, has elected the following officers: President, Joseph Waltz, of Waltz; vice-president, E. C. Maxwell, of Carleton; second vice-president, Jesse Butler, of Willow; secretary and treasurer, F. L. Edwards, of Carleton.

HUMBOLDT, NEB.—The Porter Mutual Telephone Company has elected the following officers: J. K. Cornelius, president; J. O. Shroyer, secretary; Peter Gergens, assistant.

CANDOR, N. Y.—The Candor Telephone Company has elected the following officers: President, C. P. Middaugh; vice-president, L. C. Burt; treasurer, H. D. Heath; secretary, E. D. Holly.

TRUXTON, N. Y.—The Truxton & Cuyler Telephone Company has elected the following officers: President, A. R. Bryant, Truxton; vice-president, J. B. Whitmarsh, of Cuyler; secretary and general manager, R. Hibbard, of Cortland; treasurer, P. D. Muller, of Truxton.

AVOCA, WIS.—The Avoca & Muscoda Telephone Company has elected the following officers: J. J. Hinkle, president; John Sikir, vice-president; B. W. Gillett, secretary; Homer Randall, treasurer.

NEW COMPANIES.

OAK GROVE, ALA.—The Oak Grove Telephone Company is to build a number of branch lines.

JUNCTION, ARK.—The Local Telephone Company, of Junction City, has been incorporated with a capital stock of $10,000. The incorporators are W. V. Brown, R. Y. Brown and D. K. Brown.

DAVIS, ILL.—The People's Mutual Telephone Company, of Davis, has been incorporated with a capital stock of $10,000. Incorporators are J. W. Johnson, William Arnsmeier and Fred Albertsett.

MARIETTA, ILL.—The Marietta & Seville Telephone Company has been organized.

OAKLAND, ILL.—The Embarrass Telephone & Telegraph Company, of Oakland, has been incorporated with a capital stock of $45,000. The incorporators are H. H. Knipe, E. N. Blair and J. D. Noel.

TAMAROA, ILL.—The Tamaroa Telephone Company, Tamaroa, has been incorporated with a capital stock of $2,500. The incorporators are C. O. Winthrop, C. R. Rice and J. T. Marlow.

IDA GROVE, IA.—The Farmers' Mutual Telephone Company has been organized at Ida Grove. James Walsh is chairman, and Robert H. Todd, secretary.

PARMA, MICH.—A new Independent Telephone Company has been organized by the majority of the former stockholders of the North Parma Telephone Company, which recently was purchased by the Bell Telephone Company. The new company will install a new exchange, and have direct connection with Jackson.

ADRIAN, MINN.—The German Telephone Company has been organized with the following officers: President, Al. Faragher; secretary, H. L. Prideaux; treasurer, H. Hennekes; directors, Gerhardt Lewis, Ed. Davis and John Schultz.

AKELY, MINN.—The Akely Telephone Company, Akely, has been incorporated with a capital stock of $15,000.

SPRINGFIELD, MO.—The Springfield Home Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are W. B. Scruggs, R. W. Adams, J. L. White, of Harrisonville, and T. L. Dunlap, of Springfield.

DODGE, NEB.—The Bohemian Mutual Telephone Company has been incorporated with a capital stock of $600. John K. Vlack and others, incorporators.

SILVER CREEK, NEB.—The Silver Creek Telephone Company has been incorporated with a capital stock of $25,000.

WAYNE, NEB.—The Wilbur Telephone Company has been incorporated with a capital stock of $2,800. It will conduct a telephone system at Wayne and in the rural districts of Wayne and Dixon counties. The incorporators are W. H. Bueton, F. M. Griffith, A. Grier, Ferdinand Thim and John Harder.

GRAND MANAN, N. B.—The Grand Manan Telephone Company has been incorporated with a capital stock of $2,000. Among the incorporators are G. E. Dalzell, Alex. Small and J. S. Richardson, all of Castalia, N. B.

HANNIBAL, N. Y.—The Hannibal Telephone Company has been incorporated with a capital stock of $5,000. The company will build a line from Oswego, N. Y., to Hannibal and other towns. The directors are John McFarnald, Chas. A. Cox, Mark H. Minar, James B. Burt, Walter C. Matteson, George H. Wolver and R. A. Brandt, all of Hannibal.

HANNIBAL, N. Y.—The South Hannibal Telephone Company, of Hannibal, has been incorporated with a capital stock of $1,820. The company will build a line from Hannibal to Bowens Corners and Fulton, N. Y. The directors are Peter A. Welling, Grant B. Wilson, Ernest W. Rice, George H. Wolver, Walter C. Matteson, John Brackett and Edwin G. Wells, all of Hannibal.

HENRIETTA, O.—The Henrietta Rural Telephone Company, Henrietta, has been incorporated with a capital stock of $4,000. Incorporators, W. C. Porter and others.

ALINE, OKLA.—The Carwile Telephone Company has been incorporated with a capital stock of $600. The company will build a line from Helena to Aline to Carwile. The incorporators are N. H. Ross and Fred J. Drolte, of Aline; Chas. F. Gardner, of Ringwood.

DOVER, OKLA.—The Banner Telephone Company has been organized with the following officers: President, W. E. Sweetser; vice-president, Fred Schilde; treasurer, A. J. Slief.

FOSS, OKLA.—The Foss Telephone Company, Foss, Okla., has been incorporated with a capital stock of $10,000. The incorporators are S. H. Bowman, W. M. Darnell and S. M. Darnell, all of Foss.

HENNESSEY, OKLA.—The Oak View Rural Telephone Company, of Hennessey, has been incorporated with a capital stock of $250,000. The incorporators are S. A. Clark, Rhodes Clements and H. W. Fritz.

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DRY CELLS?

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IT MAKES NO CLERICAL ERRORS.
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Write for booklet.

***The* CALCULAGRAPH CO.**
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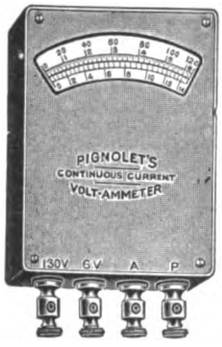

If you are not using a measuring instrument to test your lines, get one at once, as you will need it many times before the summer comes. It would be just as sensible for a grocer to try and sell sugar by guessing at its weight as it is for you to try to locate a fault in a line by the same method. PIGNOLET VOLT-AMMETERS are designed to give the best results required for testing purposes. They are not complicated nor do they require experts to operate them. Another point in their favor is their low cost. There is no instrument on the market which will give you as accurate results at anything near the price. Hadn't you better write for prices and further particulars? By buying one now you will save its cost many times over before you have had it a year.

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THE WEEK'S MESSAGES

MARQUAM, OREGON.—The Marquam Mutual Telephone Company, of Marquam, Oregon, has been organized.

MOUNTAIN PARK, OKLA.—The Mountain Park Telephone Company, of Mountain Park, has been incorporated with a capital stock of $5,000. The incorporators are W. W. Watson, C. E. Jecks, D. A. Giles, T. C. Moessner and J. C. Watson.

NEWKIRK, OKLA.—The Newkirk Commercial Mutual Telephone Company has been incorporated with a capital stock of $12,000. The directors are C. A. Johnson, H. M. Ziegler, A. J. Green, J. F. Hufbaer, G. L. Milam, W. S. Cline and A. C. Harrington, all of Newkirk.

RIPLEY, OKLA.—The Cimarron Valley Telephone Company, of Ripley, Payne county, has been incorporated with a capital stock of $5,000. The incorporators, all of Ripley, are as follows: W. E. Baker, T. A. Gordon, W. W. Van Pelt, W. H. Bowdlear, J. E. Oldham and H. E. Peog.

PROVOLT, ORE.—The Applegate Valley Telephone Company has been incorporated. The incorporators are E. Badger, E. N. Provolt and Charles Meserve.

MILTON, OREGON.—The Milton Rural Telephone Lines are to be consolidated, and a new company incorporated.

AMITY, PA.—An Independent Telephone Company has been formed at Amity with the following officers: President, Frank H. Condit; secretary, C. N. Tharp; treasurer, John Cary. The company will buiid a line from Amity to Ten Mile.

ENON VALLEY, PA.—An Independent Telephone Company has been organized at Enon Valley, Lawrence county, to cover four townships, two in Lawrence county and two in Beaver county. The company is capitalized at $10,000. The incorporators are O. I. Riddle, G. H. Dilworth, J. H. Russell, F. R. Wilson, B. F. Gealy, J. W. McGinnis, F. R. Robinson, M. E. Martin and others.

ROCHESTER, PA.—An Independent Telephone Company has been organized by the citizens of Raccoon township, Beaver county, Pa., for the purpose of building an independent telephone line to connect with the Beaver County Telephone Company's lines at Monaca. R. R. Ewing is president of the new company.

TYLERSVILLE, PA.—An Independent Telephone Company has been organized at Tylersville to build a line from Tylersville to Loganton.

LILY, S. D.—The York Troy Telephone Company has been incorporated with a capital stock of $1,750.

REE HEIGHTS, S. D.—The Ree Hills Telephone Company, of Ree Heights, has been incorporated with a capital stock of $2,000. The incorporators are B. S. Bell, John Hale, R. W. Speirs and others of Ree Heights.

VERDON, S. D.—The Farmers' & Merchants' Telephone Company, of Verdon, Brown County, S. D., has been incorporated with a capital stock of $10,000. The directors are Jos. C. Borwell, R. C. Kimmell and others.

HOHENWALD, TENN.—An Independent Telephone Company has been formed at Hohenwald, with the following officers: C. D. Loveless, president; J. F. Whitwell, secretary.

DALLAS, TEXAS.—The Northwestern Toll Line Company, of Dallas, has been incorporated. The company will construct lines from Dallas into Northwest Texas, New Mexico and Oklahoma.

MABANK, TEXAS.—The Rosenas Telephone Company, of Mabank, has been incorporated with a capital stock of $5,000. Incorporators: Will N. Wright, J. W. Wilkerson, S. M. Wilkerson, of Mabank, and C. W. Robinson, of Forney, Texas.

ROSENAS, TEXAS.—The Rosenas Telephone Company of Van Zandt County, has been incorporated with a capital stock of $5,000. Incorporators are Will N. Wright, J. W. Wilkerson and others.

YANTIS, TEXAS.—The Yantis Telephone Company, Yantis, has been incorporated with a capital stock of $10,000.

KELLER, WASH.—The Keller & San Poil Telephone & Telegraph Company is to be incorporated with a capital stock of $10,000. The company is to build lines to points on the reservation. The trustees of the company are P. Connery, W. L. Murphy, C. A. Gray, R. L. Boyle and H. A. Denton, all of Keller.

SPRINGDALE, WASH.—The Forest Center Telephone Company has been organized. The company will build a line from Springdale through Forest Center to Grays.

WINONA, WASH.—The Winona Telephone Company, of Winona, Whitman County, has been incorporated with a capital stock of $3,000. Incorporators are J. T. Billups, M. W. Fockler and F. J. Swan.

ARCADIA, WIS.—The Newcomb Valley Telephone Company, Arcadia, has been incorporated with a capital stock of $2,000. Incorporators are Edward Erickson, Samuel Hanson, L. E. Anderson, Albert Axness and J. F. Gilbertson.

PERSONAL.

H. M. COOPER has been appointed manager of the Central Union Telephone Company's exchange at Galena, Ill.

H. E. GILTNER, formerly equipment inspector for the Terre Haute district of the Central Union Telephone Company, has resigned to become manager of the Vermilion County Telephone Company's exchange at Danville, Ill.

WILL HARMON, who has for some time been auditor of the Delaware and Madison Counties Telephone Company of Muncie, Ind., has been elected general manager.

L. J. HOUSE has been appointed manager of its exchange at Fremont, O., by the Central Union Telephone Company.

FRED McKINNON has been appointed manager of the plant of the Home Telephone Company at Laurence, Kas.

O. A. RICE has recently been appointed manager of the Interurban Telephone Company's system at New London, Wis.

FREDERICK H. WHITTAKER has been appointed manager of the Central Union exchange at Seneca, Ill.

D. S. WRIGHT has been promoted by the Central Union Telephone Company to the position of General Foreman in the Indiana Equipment Department, with headquarters at Indianapolis.

MISCELLANEOUS.

NEOSHO FALLS, KAS.—O. B. Jones has purchased the telephone business of H. F. Frezel.

HATTIESBURG, MISS.—The Jones-Winters Telephone Syndicate, of which L. C. Leek is local manager, is to place its wires underground in Hattiesburg.

TOLEDO, O.—The board of public safety is to ask the city council for an appropriation of $30,000, to be used for the purpose of installing an independent telephone system for the official departments.

New Construction in the Field

BOISE, IDAHO.—The Idaho Independent Telephone Company, of Boise, Idaho, is to install at Weiser, a telephone system which will cost in the neighborhood of $10,000. A franchise has been granted, also, at Emmett, at which place a similar system will be installed.

KOKOMO, IND.—The Russiaville Telephone Company, of Russiaville, is to build a line to Kokomo.

KOKOMO, IND.—The Citizens' Telephone Company is to spend $15,000 in improving its system.

WABASH, IND.—The Wabash Home Telephone Company is to make many improvements in its system; among others may be noted the installation of a $10,000 switchboard.

HEBRON, ME.—The Hebron Home Telephone Company is making preparations to extend its lines, and improve its system generally.

HOUSATONIC, MASS.—The Farmers' Telephone Company, of State Line, is to extend its lines to Housatonic.

SPRINGPORT, MICH.—The Citizens' Telephone Company is constructing a line in the direction of Albion.

PALMYRA, MO.—The Electric Flash Telephone Company is to build a line from Palmyra to La Grange.

SPRINGFIELD, MO.—Springfield is to have an Independent telephone system to take the place of the exchange bought by the Bell last year. The Santa Fe Construction Company will invest $200,000 in a new plant.

HILTON, N. Y.—The Hilton Telephone Company is to build several new lines. It will also install a new exchange apparatus at Hilton.

EAST LIVERPOOL, O.—The Columbiana County Telephone Company is to build a line from East Liverpool to Williamsport.

BEAUMONT, TEXAS.—The Independent Telephone Company, of Beaumont, is building a line from Beaumont to Jennings, La.

FORT WORTH, TEXAS.—The Fort Worth Telephone Company is to expend $150,000 in improving its system.

WEST POINT, VA.—The West Point Telephone Company is extending its lines.

FOND DU LAC, WIS.—The Empire Telephone Company is to be connected with Dotyville, Johnsburg, Malone, Eden and Campbellsport.

KAUKAUNA, WIS.—The Fox River Valley Telephone & Tel. Company, of Appleton, is to install a telephone system at Kaukauna.

BYRON, ONT., CAN.—The Byron Telephone Company is to commence the construction of its system.

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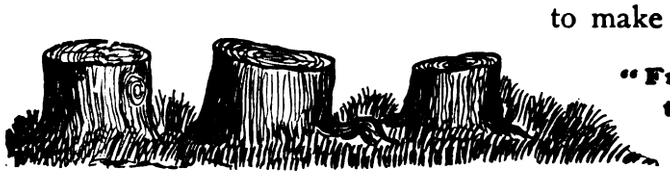
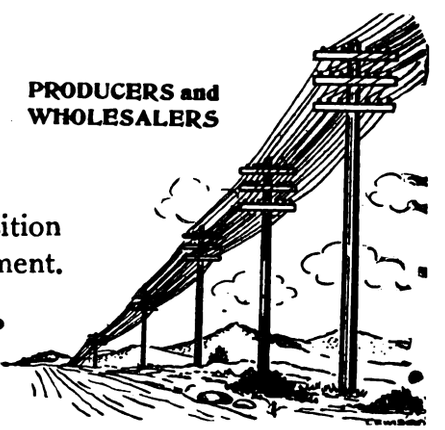


"From the Stump to the Line."



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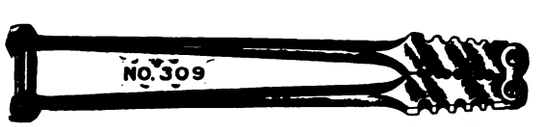

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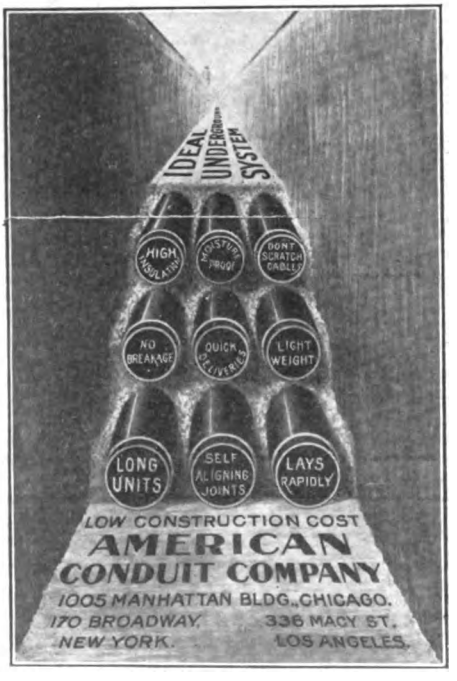
Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
Toll Tickets, Toll Station Journals, Toll Station Ledgers, Receipts for Toll Service, Monthly Check Reports, Coupon Books, Stock Certificates, Lease and Rental Records, Cash Books, Trouble Tickets, Rental Receipts, Voucher Checks, Exchange Directories, Fine Stationeries, Special Forms of All Kinds.
Write for Sample Forms and Prices.
THE TELEPHONE PRINTING CO.
DEFIANCE, OHIO

HAWKINS, W. W.
CONSULTING AND CONTRACTING TELEPHONE ENGINEER
Plans and Specifications for Complete Telephone Equipments. Existing Plants Remodelled.
Private Branch Exchanges Installed. Engineer for
WILLIAMS TELEPHONE & SUPPLY CO.
No. 79 CENTRAL AVENUE, CLEVELAND, OHIO

SAMUEL G. McMEEN KEMPSTER B. MILLER
McMEEN & MILLER
ENGINEERS: CONSTRUCTORS
Telephone and Telegraph Properties
MONADNOCK BLOCK CHICAGO



TELEPHONE & TELEGRAPH WIRE
HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
—MADE IN THREE GRADES—
"EXTRA BEST BEST" (E.B.B.). "BEST, BEST" (B.B.). "STEEL"
INDIANA STEEL & WIRE CO. MUNCIE, INDIANA

G. FELSENTHAL & CO.
219 E. Van Buren St., Chicago
MANUFACTURERS OF
Specialties in Celluloid for Telephone Companies, Instruction Cards, Name Plates, Etc., for use on Transmitters or Coin Boxes
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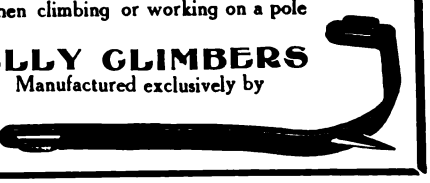
M. LANZ & SONS
Manufacturers of
Malleable Iron Guy Clamps
WE GALVANIZE BY THE HOT PROCESS
PITTSBURG, PA.

You will have a feeling of ABSOLUTE SECURITY when climbing or working on a pole if you are wearing
THE CELEBRATED DONNELLY CLIMBERS
Men who know say they are the best ever made Manufactured exclusively by
THE BLAKESLEE FORGING CO.
PLANTSVILLE, CONN.


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Manufacturers of
The "Couch" Automatics
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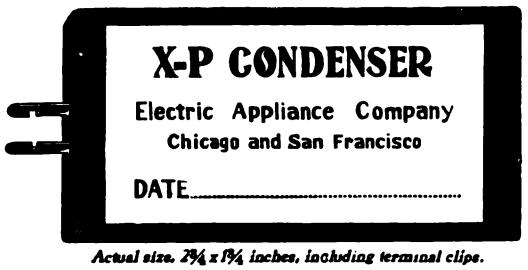

Actual size. 2¾ x 1¾ inches, including terminal clips.

"X-P CONDENSERS"

WILL HELP INCREASE YOUR SUBSCRIBERS

By installing them in your bridging telephones you improve the service. Better send us a trial order.

Electric Appliance Company, Telephone Manufacturers

134-136-138-140 West Jackson Boulevard, CHICAGO

Branches { SAN FRANCISCO 717-719 Mission Street | DALLAS 418 Main Street | NEW ORLEANS 139-141 Chartres Street

THE GOULD PLATE

represents the highest development of storage battery invention.
It possesses far greater contact surface for active material, has higher watt-efficiency at all practical rates of discharge, and greater capacity per unit weight of active material than any other battery of the Plante type.
It will pay you well to study the records of recent Gould installations. Write for our bulletins.

SALES OFFICES
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Gould Storage Battery Co.

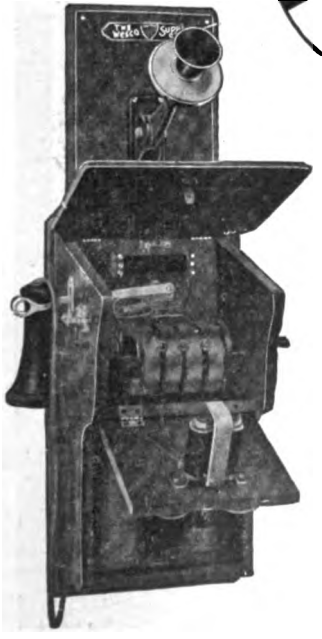
MAIN OFFICES
1 West 34th St.,
New York City.
WORKS, DEPEW, N. Y.

"ALL WORKS OF QUALITY"

WESCO

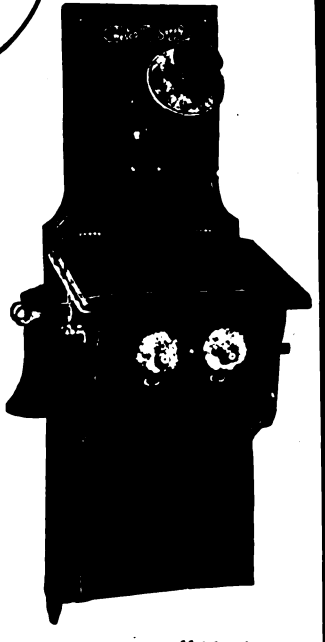
Says RUSKIN,

"must bear a price in proportion to the skill, time, expense, and risk attending their invention and manufacture. Those things called dear are, when justly estimated, the cheapest; they are attended with much less profit to the artist than those things which everybody calls cheap. Beautiful forms and compositions are not made by chance, nor can they ever, in any material, be made at small expense. A composition for cheapness, and not for excellence of workmanship, is the most frequent and certain cause for the rapid decay and entire destruction of arts and manufactures."



The Wesco "Ideal."

WESCO



The Wesco "Ideal."

Our Booklet. "PERFECT TELEPHONES"

will interest all who appreciate the economy of buying THE BEST. Write for it.

The Wesco Supply Co.

Branch Warehouse
FORT WORTH, TEX.

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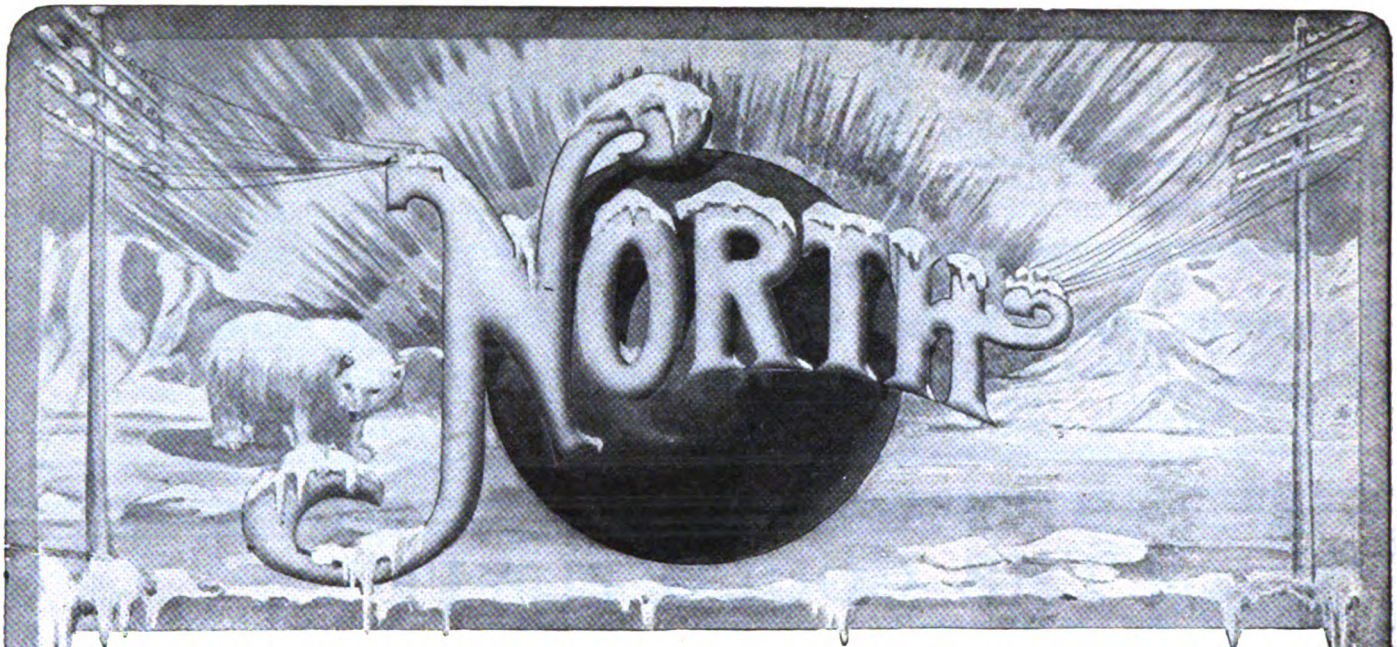
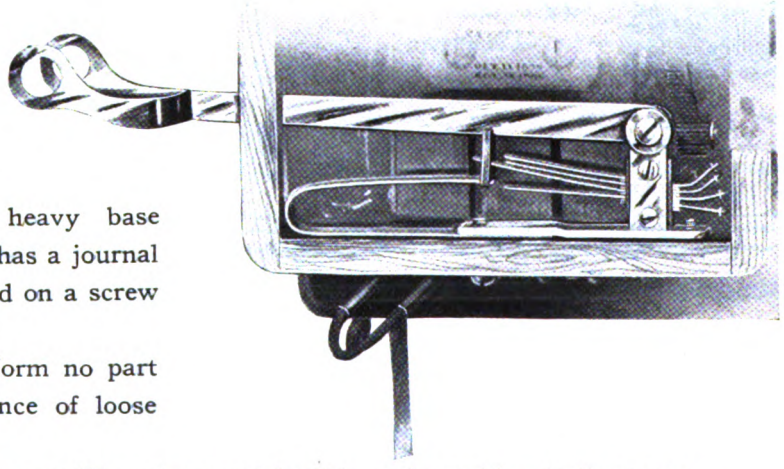


NORTH'S horizontal lever adjustable tension hook-switch is strong, simple, reliable—insuring perfect action—positive contacts.



Entirely self-contained—a heavy base made in one piece. The lever has a journal bearing hinge—does not depend on a screw to support it.

The lever, base and hinge form no part of the circuit—avoids all chance of loose contacts or accidental shocks.

The controlling spring is German Silver, long and flexible, and capable of adjustment.

The contact springs are German Silver—provided with pure platinum contact points (not platenoid or other alloy). They are made straight—to give maximum resiliency.

They are mounted in a slotted pure hard rubber block (not fibre) and held in place by a brass clamp and two long machine screws—no chance to work loose.

All contacts and terminals in plain view.

DALLAS CLEVELAND CHICAGO

THE NORTH ELECTRIC CO.
CLEVELAND, OHIO

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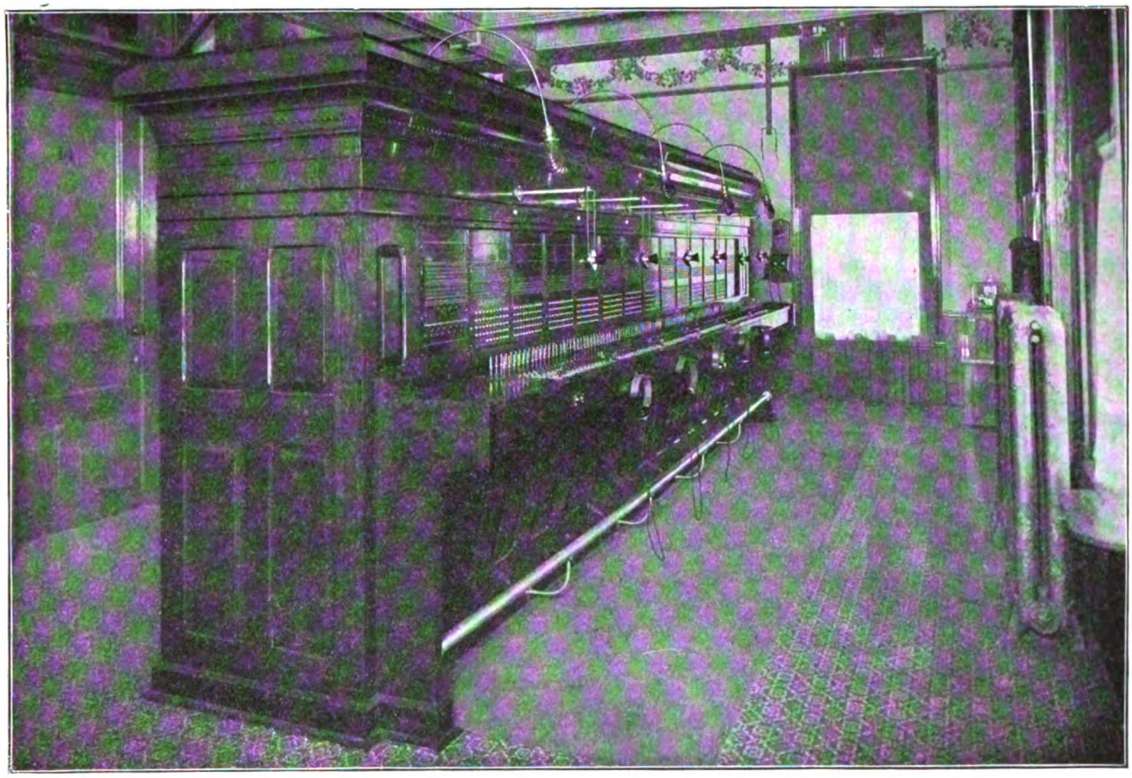
Century 100% Good

DO YOU KNOW that we have been manufacturing a common battery equipment for over six years?

If you are in the market for common battery switchboards or telephones, it would be advisable to make an inspection of and test our apparatus.



You will find it superior in many ways.

We can refer you to Exchanges who have used our common battery apparatus with entire success for a number of years.

Let us make you prices on your requirements in these lines.

Samples will be shipped, charges prepaid.

CENTURY TELEPHONE CONSTRUCTION CO.

332 Ellicott Street BUFFALO, N. Y.

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MONARCH

SWITCHBOARDS

FIG. 1.

FIG. 2.

The two boards shown above have been recently installed by us in an exchange using a 700 line Central Energy Board. Figure 1 shows a two position combined monitor's and wire chief's desk with volt meter and ail other conveniences for equipment of this nature.

Figure 2 shows a two position toll board equipped with twenty toll line signals and twenty lamp transfers to the local board.

We are prepared to build all types of magneto boards including toll and exchange equipments. Special boards such as the above can be furnished without serious delay and at prices that will be satisfactory. WE solicit inquiries and will gladly submit prices and specifications.

Monarch Telephone Mfg. Co.
CHICAGO, U.S.A.

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DEAN TELEPHONE APPARATUS

A Good Investment

The highest quality in any investment should be its permanency or the inherent ability to make it secure. The Dean Selective Party Line Equipment as security, represents the highest value and possesses that quality which enables it to grow stronger as it grows older.

At the time that the following clipping was taken from one of the Cleveland daily newspapers, the Cuyahoga Telephone Company had invested in and had installed over seven thousand (7,000) Dean Selective Harmonic Ringers, which has proved to them, as well as all other companies who have adopted it, a Good Investment.

...ts and cleanest ...
...d. All grocers sell ...
Now 10 cents.

TELEPHONE

Our party line selective ring don't worry you or your neighbor—That's why we're putting it in so many residences—Ask us about it.

Contract Department—Central 31.

"Look for the shield."

Cuyahoga Telephone Company
Electric Building Prospect Avenue

Write for our Folder Number 5 A.

BRANCH SALES OFFICES

511 Kansas City Life Building
Kansas City, Mo.

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Los Angeles, Calif.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY— —THE BEST IS THE CHEAPEST

KELLOGG

FREQUENCY POLE CHANGER

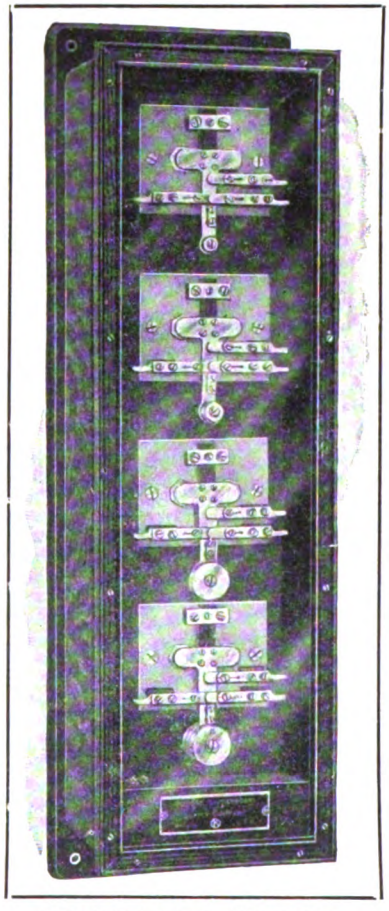
Utmost SIMPLICITY of Operation

THE EFFICIENCY

and beauty of the Selective Harmonic Ringing System of the Kellogg Company has been fully recognized by the entire Independent field, but the difficulty, heretofore, has been that the system required a generating device which involved a rather high first cost, and a relatively large consumption of energy.

The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



"FRONT VIEW"—COVER ON.

ADVANTAGES

1. Requires no attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. Dry cells can be used for the ringing current.
5. They can be furnished to work successfully under any load.
6. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
7. Operates successfully within the limits of 17 to 28 volts.
8. Noiseless in operation.
9. Only three contacts on each vibrator.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

Send for Folder No. 3 **Correspondence Solicited**

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES:

PHILADELPHIA, Keystone Tel. Building **CLEVELAND, Electric Building**

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Drive and Twist

Installed in 60 Seconds

Pulls on SOLID DIRT

CONSIDER THE

Time Money and Labor

SAVED BY USING THIS ANCHOR THEN WRITE FOR PRICES, OR BETTER STILL, PLACE A TRIAL ORDER

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

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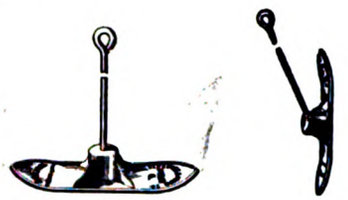
"HERCULES" ANCHORS THE IRON DEAD MAN

Nos. 5. 4. 3. 2. 1.



Made of Malleable Iron in Five Sizes

No. 1—Rod	½" x 6'	Plate	5" x 10"
No. 2— "	5/8" x 6'	"	6" x 15"
No. 3— "	¾" x 7'	"	8" x 18"
No. 4— "	1 " x 8'	"	10" x 22"
No. 5— "	1¼" x 9'	"	12" x 30"

We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

TOLEDO, O.

COMBINED

Cash Register and Pay Station

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

No Disputes,

No Trouble.

It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE

United States Coin Register Co.

TOLEDO, OHIO

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If You are Looking for Honest Value

in telephones, we can supply your wants. Our new Edison telephone is built correctly all the way through. It sells at a price which enables us to make a fair profit, and yet is not as expensive as many other so-called high grade instruments.

We take the greatest care in its manufacture to see that every part is right before being assembled; and, after it is finished, we make every possible test to be sure that everything is in good order before it leaves the factory.

No one could do more; in fact, many are not half so particular. Let us quote you prices.

THE EDISON TELEPHONE CO.
60-68 West Van Buren Street
CHICAGO, ILL.

STERLING ELECTRIC COMPANY STERLING ELECTRIC COMPANY

Without a Doubt

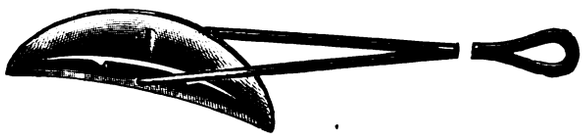
The STERLING No. 18
is the best telephone for all around use of any type and is not surpassed by its many competitors. ∴ ∴ ∴
¶ Does not cost any more than other telephones and will give you better service.

We Know It

STERLING ELECTRIC CO.
La Fayette, Ind.

"They Never Pull Up"

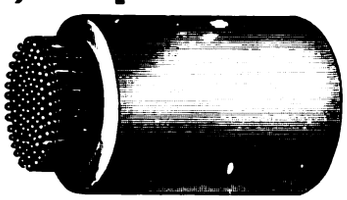
THE MILLER SAFETY ANCHOR



Elmer P. Morris Co.
51 Dey Street - NEW YORK
Eastern and Export Agents

THE MILLER ANCHOR CO., Norwalk, O.

Cables, Paper and Rubber



THE F. BISSELL COMPANY.
TOLEDO, O.

TOLEDO, OHIO THE F. BISSELL COMPANY

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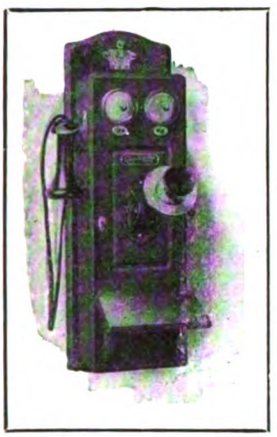
The Successful Man

is one who can distinguish good from bad, and selects for his business needs only that which has real merit. The successful men in the telephone business are using our New Beauty telephones, which proves our oft-repeated assertion that they are the best that brains can produce or that money can buy.



Back of this statement there is an interesting history. We always believed there was a demand for an instrument superior to any other. The trouble was to find it. This took time, but we persevered, and at last we discovered the real article. That our judgment was not at fault is amply proven by the steady stream of orders we are receiving. If you have not ordered, just write and we will do the rest.

EWING-MERKLE ELECTRIC CO., ST. LOUIS, MO., U. S. A.

AKRON, Ohio—
OAKLAND, California—
TACOMA and
BELLINGHAM, Washington

have all gone Automatic—Akron for 3,000 lines, Oakland for 5,000, Tacoma for 4,000 and Bellingham for 1,000.

Merit, absolute merit, was the reason why Automatic Telephone Equipment was selected by the Independent Companies in these cities.

They wanted the best, the very best, in telephone equipment.
They took their time and looked hard for it everywhere.
They found it in the Automatic.
That's where you will find it when you are ready to see it.
That's where the Independent Companies in all these cities found it—they adopted the Automatic:

Chicago, Ill.	South Bend, Ind.	Albuquerque, N. M.	Westerly, R. I.
Grand Rapids, Mich.	Aberdeen, S. D.	Traverse City, Mich.	Manchester, Ia.
Columbus, Ohio,	Miamisburg, Ohio.	Auburn, Maine.	Princeton, N. J.
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Auburn, N. Y.	Battle Creek, Mich.	San Diego, Cal.	Wausau, Wis.
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AUTOMATIC ELECTRIC COMPANY
Van Buren and Morgan Streets, CHICAGO, U. S. A.

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Central Energy Telephones

Stromberg-Carlson

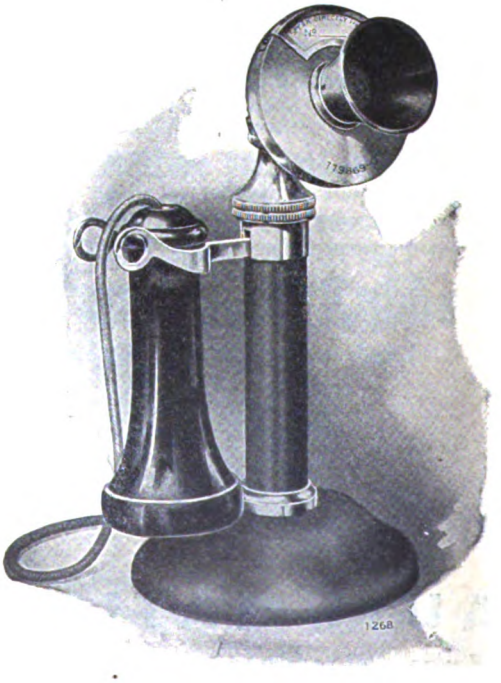
TELEPHONE MANUFACTURING CO.
ROCHESTER, NEW YORK

IF you use or contemplate using Central Energy Telephones it will pay you to get a copy of this new bulletin. There is sufficient evidence in it to prove that the telephones illustrated therein are without exception the most modern and nearest to perfection of any ever placed on the market. This statement is not based on the fact that our cabinets are better finished, that we have a better transmitter or a removable hookswitch, but the telephone taken as a whole.

There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?



Stromberg-Carlson Telephone Mfg. Co.

General Offices
Rochester, N. Y.

Branch Sales Office
Chicago, Ill.

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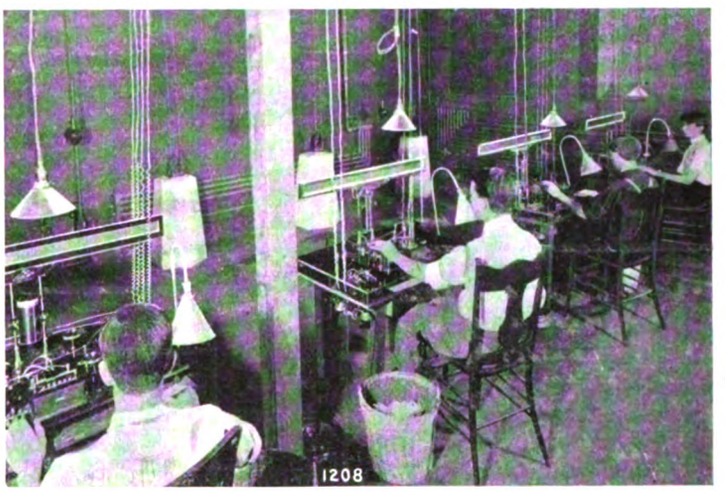
WE MAKE CABLE

MYSTERIES OF THE WIRE

Take two pieces of cable of the same size but manufactured at different factories. From all outward and visible signs there is no difference between the two. Suppose we install them under approximately similar conditions, and make a speaking test from instruments located at equal distances from the exchange. Talking from one station, the operator says she hears us splendidly, just as if we were speaking direct. When we converse with her from the other instrument, she claims our voices don't sound natural, in fact she doesn't hear us half as well.



DISCOVERING THE SECRETS OF THE CABLE

The reason for this is the difference between the electrostatic capacities, inductances, and resistances of the two circuits. Neither of these factors can be determined by a superficial examination and only manifest themselves when the cables are subjected to special tests.

They depend upon a plurality of conditions which arise during the course of manufacture and therefore the highest engineering and mechanical skill is required to insure that in the passage of the cable through the different stages of construction their correct relation to each other is maintained.

For instance, if the paper insulation is not wrapped regularly, or is too loose or too tight, or if the twists of each pair are not uniform, or if the lead sheathing is applied under varying pressure, the quality of transmission will be greatly impaired.

These are but a few of the details which must receive the closest attention; there are many others of equal importance, any of which, if not watched with the greatest care, will appreciably affect the working of the cable after it is erected.

Since it is not possible for every company to lay down a set of specifications which will insure its securing the desired quality, or to conduct the necessary tests to determine whether the specifications have been fulfilled or not, it is obvious that the order should be placed with that firm which has the highest reputation for its product, or, in other words,

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY.

We have, without a question of doubt, the best equipped cable plant in the country. The engineers in charge are experts and know the requirements of manufacture from A to Z. All the apparatus is new and of the latest type. The tests are the most exacting ever applied, and the standard of manufacture is based upon a set of specifications heretofore thought impossible of attainment for commercial purposes.

No matter whether you buy 100 feet of five pair, or several miles of 300 pair cable, you can rest assured that there isn't one iota of difference in quality.

Write for our cable book 79B, it will give you an insight into our methods of cable manufacture.

STROMBERG-CARLSON TELEPHONE MFG'CO.

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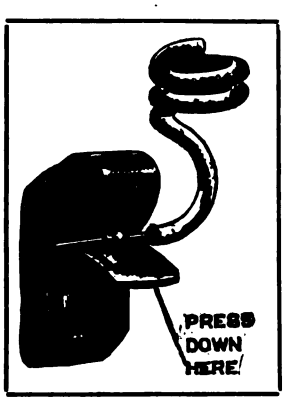

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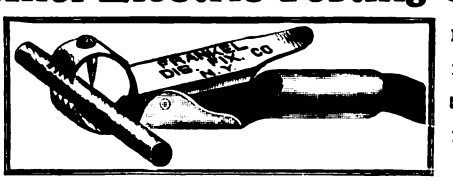

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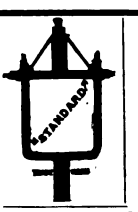

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The Telephone Line*

By S. P. Grace, Chief Engineer, C. D. & P. Tel. Co.

THE great increase in the number of telephones during the past ten years has been widely commented on in both the public and technical press. It does not need a large imagination to conceive the magnitude of the system if the present rate of increase keeps up. To give service to all these telephones there has been splendid work done by the telephone engineers in the designing of telephones and switchboard apparatus which would furnish rapid and reliable service. As important as the telephone instruments and the switchboard apparatus are, a little consideration will make clear to us that the telephone lines connecting the subscribers to the exchange are of still greater importance. This is so because of the electrical and mechanical problems to be solved and because of the large sums of money required for building the lines to the subscribers' premises. In a modern plant it is safe to say that the switchboards, instruments and buildings represent not over 25 per cent. of the total plant cost, the remainder being expended in building the distributing lines. It is evident, therefore, that the economies of line distribution should be thoroughly understood in order that a plant may be built with the smallest annual charges, for the telephone being not a luxury but a necessity to the business and social interests of our cities, every effort should be made to furnish service at a reasonable cost. For this reason the most economical systems of line distribution must be earnestly sought for. It is to be regretted that in the past the same careful engineering study given to switchboard problems has not also been applied to the engineering and economic problems of line distribution. In considering the development of systems for distributing telephone lines it will not be amiss to look back and run over hastily the various methods which have been proposed and used for this purpose. Before the introduction of the telephone there already existed the lines of the various telegraph companies, and it was but natural that when the telephone came into the field the construction of its lines should follow the same general practice developed by the telegraph companies. It was soon found, however, that the number of telephone lines multiplied much more rapidly than did the telegraph wires, the result being poles of great height, equipped sometimes with as many as twenty cross arms, each arm carrying from ten to twenty wires. When these lines became overcrowded it was customary to relieve them for short distances with aerial cables made up of rubber covered wires. A little later the dry core lead sheathed paper cable was invented, and it was largely used to supplement the open wire leads. These heavy open wire leads were subjected to many disturbances because of sleet and wind storms, and, furthermore, they became such an "eye sore" that in many cities the wires were ordered underground in the business districts.

Fig. 1. Example of distribution of lines from aerial cable in residence district.

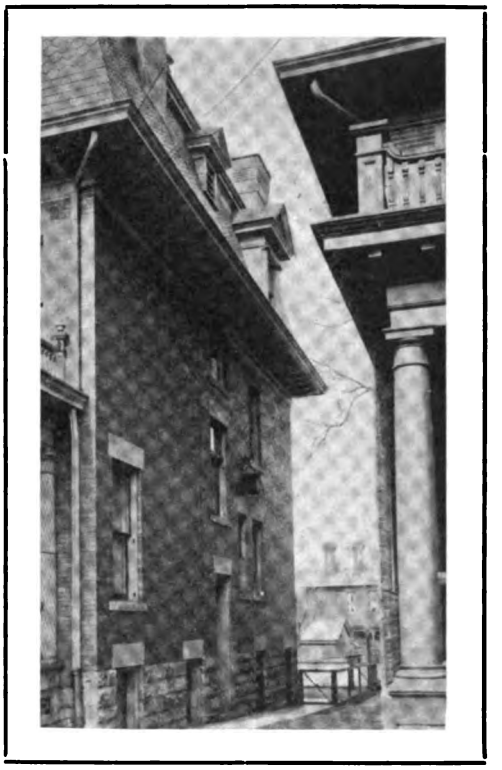

Fig. 2. Method of attaching paired wire loops to residences.

It is interesting to note that the first underground distributing conduit system for telephone wires was installed by Mr. Metzger and Mr. Paynter of the C. D. & P. Telephone Company, in Pittsburg, on 5th Avenue between Wood and Liberty Streets. The roof fixtures had become too heavy for the buildings supporting them, and as permits for poles on the streets could not be secured, it became imperative to place the wires underground. The cables were laid in the bottom of a wooden box and immediately over them were placed, at intervals, porcelain plates containing forty holes, through which were pulled distributing wires to be run into each basement along the route. After the cables and wires were in place the entire box was filled with pitch, and this construction gave fair service for a little while. It was only a short time, however, until all forms of "solid systems" in Pittsburg and in other cities were abandoned in favor of the "drawing in system," the standard

*Paper read before the members of the Pittsburg section of the American Institute of Electrical Engineers, March 13, 1906.

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practice calling for vitrified clay ducts, into which the cables could be readily drawn as well as withdrawn from them at will.

The direct underground connection of subscribers' lines was abandoned practically everywhere on account of its cost, in favor of the distributing pole connected to the underground cables, from the top of which radiated wires to the various subscribers' premises. In the districts outside of the congested business district it continued to be the practice of most companies for many years to adhere to the tall, open wire leads, supplemented with aerial cables. However, the C. D. & P. Telephone Company early developed a system of distribution by means of aerial cable placed on low poles and provided with terminals every two or three hundred feet, which has given excellent satisfaction for a number of years and is now being extensively used. A more complete description of this system will be given later on in this paper.

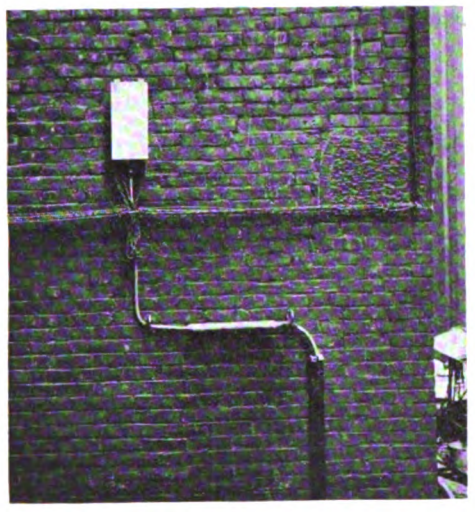

Fig. 3. Detail of wall wiring plan of distribution.

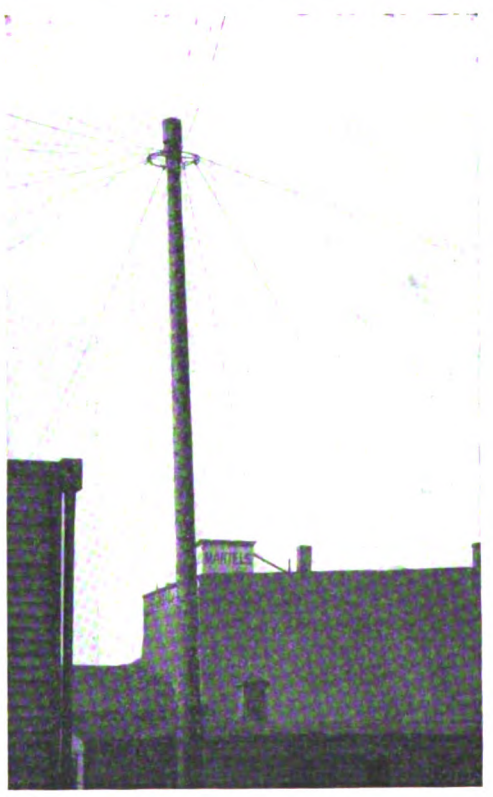

Fig. 4. Distributing pole, with loops to subscribers' stations radiating from high cable terminal.

The development of telephone line distribution having thus been briefly sketched, let us consider what, in the present knowledge of the art, can be considered the best practice of today for the distribution of the subscribers' telephone lines. It has been many times recommended and demanded by those not experienced in the art that all telephone wires should be placed completely underground, and these persons point to the water and gas systems as an example. There is, however, a fundamental difference between these systems, usually lost sight of. In the case of gas and water, one pipe is common for an entire street and may be tapped anywhere along its length. In the case of telephone distribution we must provide a separate pair of wires all the way from the exchange to each subscriber's premises, and no common line can be tapped as is done in the gas and water systems. This makes the difficulties and the expense of direct underground connection very great, and if enforced, would necessarily result in a large increase in the cost of service to the subscriber.

In modern engineering practice, before building the distributing routes in any city or district it is customary to prepare a development study which shows the number of subscribers to be expected at the end of definite periods for the next twenty years, and also to predict the probable routes and the number of ducts required for this distribution. From studies recently made it seems best to limit the number of wires carried in cables on pole lines to about 400 pairs, and that above this limit the distribution should be made underground. On this basis it will be seen that it is economical to extend the underground conduit system along what might be called "feeder routes" throughout the residence sections of the city. In districts where there are underground conduits it is to be recommended that direct underground connections be made to the various buildings, wherever the number of telephones in each building will justify the expense of such a connection. This is particularly true of office buildings, apartment houses, large stores, hotels, etc.

Where direct connection is not economical the vault system or the wall wiring system may be used. In the vault system a cable is run into one of the basements in the block, and from its terminal are carried distributing wires through the other vaults to the various telephones. This system is limited in its application, because of the irregularities and sometimes the absence of vaults, and because of the objections of property owners to having the telephone company's employes frequently passing through

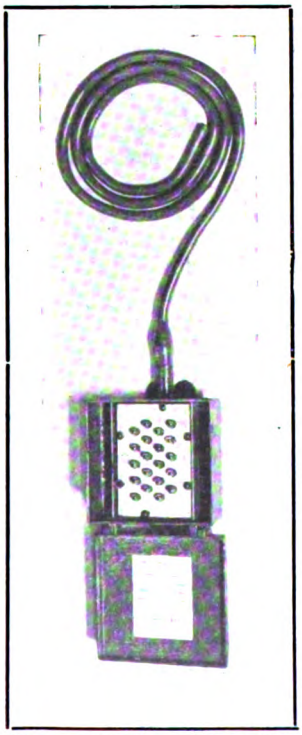

Fig. 6. Photograph of ten pair cable terminal.

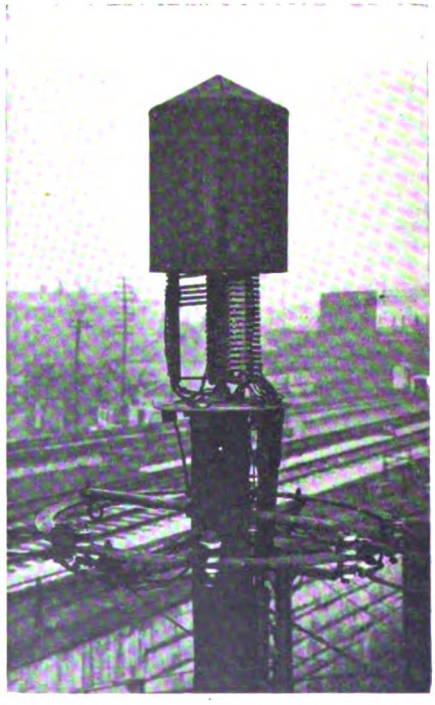

Fig. 5. Detail of terminal shown in Fig. 4, with cover partially removed. Circle top and method of leading off station loops shown below the terminal.

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their basements. In the wall wiring system a small terminal is placed on the rear wall of one of the buildings, and from it are run through rings, twisted pair No. 18 B. & S. soft copper, rubber covered and braided wire to the different telephones. This type of distribution is very neat, economical in first cost, and the maintenance expense, because of the protected condition of the wires, is very small. It will be found that this style of distribution is particularly suited to second-class business districts and first-class residence districts in the vicinity of underground conduit routes where the buildings are built close enough together to prevent long spans of ring wiring. In Figure 3 is shown a typical example of this kind of wiring. Where the buildings are very much scattered and the lot and building lines irregular, it seems that some form of a distributing pole will furnish the best and most economical service pending the time that the block is so closely built up as to warrant direct connection or wall wiring. It is possible to design this type of pole with a small circle top and if the wires are strung from it in a neat manner without attempting to encompass too much territory, the effect, although not beautiful, is not displeasing. A typical example of distribution from a distributing pole is shown in Figure 4. In Figure 5 is shown the wiring of one of these poles at close range.

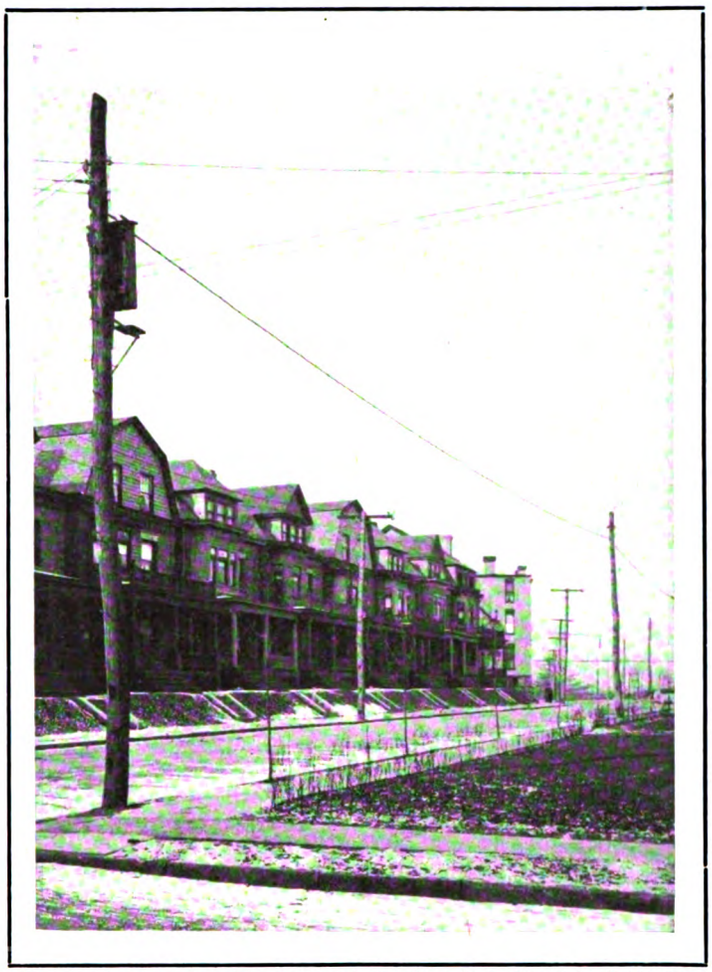

Fig. 7. Example of aerial cable terminal, with paired wires led off directly to nearby residences.

After agreeing that the main feeder routes should be underground and after providing for distribution in the immediate vicinity of these routes by means of direct connection, vault or wall wiring systems, as described above, there still remains the problem of distributing aerially the subscribers' lines on the many side streets. In the majority of our cities to attempt to make such distribution completely underground would either financially involve the telephone companies or else make the cost of service prohibitive to the subscribers. As explained earlier in this paper, the aerial distribution of telephone lines has in the past largely been done by means of tall open wire leads, supplemented with aerial cables. On account of the rugged character of the territory of the C. D. & P. Telephone Company the streets in the various towns are, as a rule, very narrow and crooked, which made extremely difficult the building of tall, open wire leads for distributing telephone lines.

Early in the year of 1898 it became apparent to the engineers of the C. D. & P. Telephone Company that some new form of construction must be developed if it was hoped to distribute aerially the thousands of wires being required by the rapid expansion of the business of the company. An aerial cable system of distribution was conceived by Mr. Bliss and Mr. Snyder of the Engineering Department, and they, in conjunction with Mr. Donaldson of the Construction Department, proceeded to prepare plans for its installation. It should be stated, however, that the Bell Telephone Company of Philadelphia independently installed, at this time, an aerial cable system in Germantown, Pa., although for several years they did not extend this type of construction. Since 1898 the aerial cable method of distribution has been followed exclusively in the territory of the C. D. & P. Telephone Company, wherever it was desired to distribute subscribers' lines aerially. Low poles of 30 to 35 feet in length have been used and aerial cable placed at the tops of the poles. On alternate poles and sometimes on every pole was placed a 10-pair junction box. Each pair usually appeared somewhere along the lead in from two to three separate terminals, so it was possible to make use of any particular pair at different points, and furthermore the multipleing was so arranged as to permit the economical grouping of party lines. From the lock nuts of the terminals No. 14 B. & S. gauge copper, rubber covered and braided twisted pair wire was strung direct to the protector at the subscriber's premises, no cross arms being used along the lead. On account of the short length of rubber insulated wire used in running the subscriber's loop, no protection is necessary at the cable

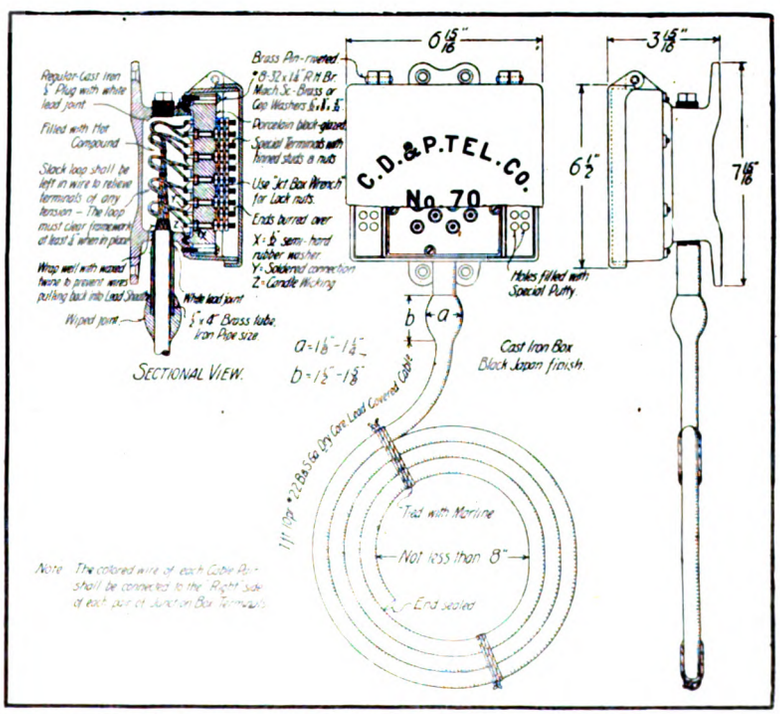

Fig. 8. Detail of cable terminal used for distribution as shown in Figs. 1 and 2.

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terminal, but each line should be fused at the place where the aerial cable is connected to the underground cable. A cable system of this kind is highly useful for distribution at right angles to underground conduit base lines and along streets that will in the future be provided with underground subways. Construction of this kind is not an "eye sore," does not invite criticism, and the result is that underground legislation lies dormant for many years. An example of this style of construction is shown in Figs. 1, 2 and 7, and a detail of the construction in Fig. 9.

Because of the large number required, an important part of an aerial cable system is an efficient and economical terminal. About two years ago this matter was carefully investigated and a terminal designed which was low in first cost, low in maintenance, and possessing a long life. This terminal is built up of essentially two elements, a cast iron box and a porcelain block for mounting the lock nut terminals. In developing this terminal the first point insisted upon was the use of a dry core cable for the tapping cable, which form of cable is cheap and besides is easily handled and spliced by the cable splicers. A drawing of this terminal is shown in Fig. 8 and a photograph in Fig. 6. It can be used for vault wiring, wall wiring, and on poles for aerial cable lines. The cost of a 10-pair size is $2.45, and it is believed that the life will be at least fifteen years. The labor of placing and splicing is $1.70 when connected to a 50-pair cable, and the material used for splicing amounts to $1.15, which makes the cost of a complete 10-pair terminal $5.30. This type of terminal has been in service nearly two years, and tests in all kinds of weather have shown them to have a high insulation resistance.

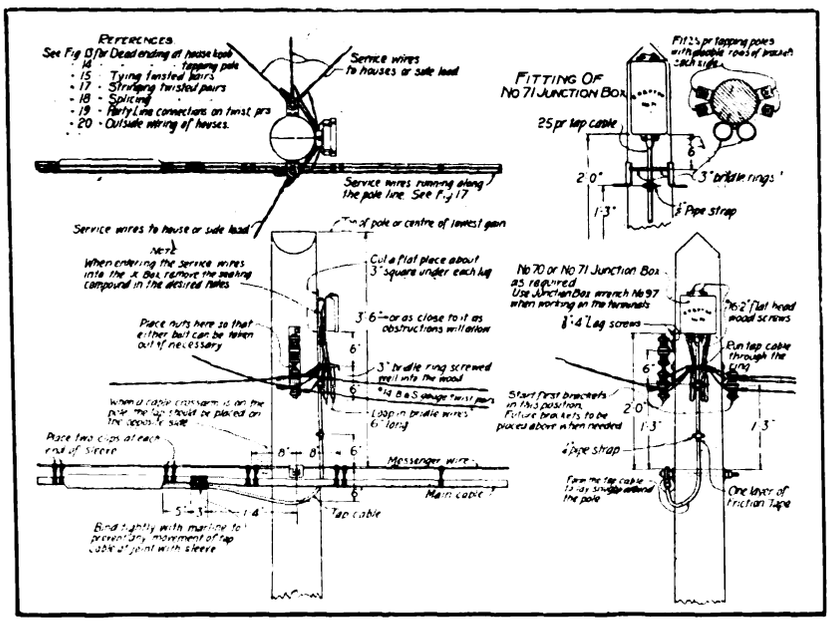

Fig. 9. Details of construction under distributing plan illustrated in Figs. 1, 2 and 3.

About two years ago a number of studies were made to determine the most economical system, or in other words the system having the lowest annual charges, for distributing telephone lines aerially. The annual charges is made up of interest, taxes, depreciation and maintenance, and it is apparent that the system having the lowest first cost may not be the most economical in the long run. Different groupings of subscribers were assumed and their distribution was effected by open wire systems, aerial cable systems, aerial cable with taps on every pole, aerial cable supplemented with bare wire, etc. It was found as a result of these studies that the aerial cable system with taps on alternate poles and with rubber covered wire, directly connected from the aerial cable terminals to the protector in the subscribers' premises was generally the most economical. This system, besides being the most economical, is by far the most sightly of any form of aerial distribution.

It is obvious that on many streets where there are but a few telephones it would not be economical to place an aerial cable at once, but the distribution must be initially effected either with bare wire or twisted pair rubber covered wire. A study of these cases showed that it was economical to distribute all telephone lines within a thousand feet of aerial cable routes with twisted pair wire strung on iron distributing backets, no cross-arms being used. Where the distance exceeded one thousand feet and where there were no obstructions in the way, it proved to be economical to distribute with No. 14 N. B. S. bare copper wire placed on cross-arms, the loop to the house, however, being run with twisted pair wire. It was further proved that it was desirable both from an economical standpoint and from the standpoint of appearance and service to replace the bare or covered distributing wire with an aerial cable when there was an average of about ten circuits on the line. The study also showed that when this cable was placed it was economy to remove the old distributing wire, and not attempt to use it by placing taps on the cable far apart. It may be taken as fundamental that it is not economical to parallel cable wires with outside distributing wires strung on cross-arms or brackets. The cable should be so tapped as to make the length of the subscribers' loops a minimum. This last point is very important and every effort should be made to extend the cable system and make the subscribers' loops of a minimum length. If this is done it is economy to construct them of high grade material, i. e., of first quality twisted pair rubber insulated and braided copper wire.

Summarizing, it would seem that the following rules for distributing telephone subscribers' lines may be followed with economical results:

First, that where the number of circuits will exceed 400, underground subways be built, and the distribution in the immediate vicinity of these feeder routes be effected by direct connection, vault systems, wall distributing systems, or circle top distributing poles, according to local conditions.

Second, that where aerial distribution is resorted to a cable be placed on low pole lines, in general not exceeding 35 feet in height, if the number of subscribers will justify the expense of placing the same. This cable is to be provided with 10 or 15-pair terminals without protection on alternate poles, from the lock nuts of which to the subscribers' premises the connection should be made with twisted pair No. 14 B. & S. gauge, hard drawn copper wires, insulated with a high grade of rubber compound and protected with heavy, separate braids. Where the distribution is very dense a tap may be placed on every pole, and in thinly settled districts through which the cable may pass, a tap should be placed wherever by so doing 300 feet of twisted pair cable can be saved.

Third, that on side leads at right angles to aerial cable lines, twisted pair wires strung on brackets should be used for distribution to subscribers located within a thousand feet of the cable line. If the subscribers are at a greater distance than one thousand feet, all distribution on these side leads should be effected by means of No. 14 N. B. S. bare copper wire, strung on standard cross-arms, provided there are no obstructions in the way, such as trees, foreign wires, etc., which would necessitate the use of high poles. If obstructions are met with a special study should be made to determine which is most economical setting of high poles, use of twisted wire on low poles, or the placing of a cable.

Fourth, that when the number of circuits on a pole line reaches ten to fifteen, a cable should replace them. This cable should be provided with terminals on alternate poles so that the bare wire or covered wire formerly strung along the lead for local distribution can be removed and returned to stock, since as before stated, it is not economical to parallel cable wires with bare or covered distributing wires.

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It is certain that in the coming years the number of telephones is going to increase at a most rapid rate, and the engineer has before him a difficult problem in designing and constructing the lines necessary to connect these telephones to their exchange centres.

It is true that as the number and therefore the telephonic density increases, the line construction cost per telephone is very materially reduced, and it may be that some time in the future we can see the way clear for a complete underground distribution of all telephone lines on the most important streets of our cities. I believe, however, that this period is many years ahead, and it can well be asked, Why should the telephone companies, and therefore the public served by them, be burdened with the additional expense entailed by complete underground distribution as long as it is possible to economically distribute in a sightly manner from properly designed aerial cable lines?

Forcing Collections*

By F. V. Newman.

WHEN Independent telephone companies were first established, it was necessary, owing to conditions, to secure the largest number of subscribers available. Consequently, not enough attention could be given to the work of systematizing and forcing collections. In the rush for new subscribers, it often occurred that the financial liability of many of the subscribers secured was such that they were unable to promptly meet their rentals when due. The Citizen's Company has now made arrangements with the local credit company to furnish a report when in doubt concerning the financial standing of new applicants. This has proven a good investment. We have found it necessary to insist on payment of the first quarter's rental before any work is done toward the installation of the service.

It has been demonstrated that we have already saved enough money, by refusing to make installations to pay the cost of obtaining reports from the credit agency. If the credit company's report is unfavorable, and the subscriber does not pay the quarter's rental in advance, the application is cancelled. If one quarter's rental is paid promptly in advance, the information furnished by the credit company is filed for future reference, and is constantly reviewed to see that the subscribers' payments are promptly made. This has given us a mint of valuable information, and put us in a position where we are in constant touch with the financial conditions of our subscribers.

New companies, at the time of starting business, as a rule adopt the plan of allowing a discount for payments made at the office for rentals in advance. It might be interesting to know the cost of making collections in the Grand Rapids exchange of the Citizen's company, an exchange of 7,470 telephones. The total of the gross rental and toll service per annum was about $250,000.00 for the year of 1905, and the cost of collections was about two per cent. of the whole amount. If the Citizens' Telephone Company had in vogue the discount plan at the present time, with the present rates in force, it would cause a loss. Persons who avail themselves of the discount are the people who pay the bill on presentation by the collector. If the Citizens' Telephone Company were to allow a discount of only two per cent. the cost of making collections would be increased, as even with the discount plan it is necessary to engage a certain number of collectors to force the slow or delinquent subscribers to pay, as well as to collect amounts due after telephones have been discontinued, and to this must be added the cost of mailing and collecting of toll bills under the discount plan.

During the months of January, 1905, 53 per cent. of the whole amount of rental and toll earnings for the Grand Rapids exchange was collected. During the quarter, 85 per cent. of the whole amount was collected. During the month of January, 1906, the first month of the quarter one year later, 64 per cent. of the amount was collected, an increase for one year of 11 per cent. This was done through good systematic efforts on the part of the collection department, with the co-operation of the management of the company. We believe it is advisable, unless a special request is made to have them mailed, to have a collector deliver all bills. It is customary to have the bills arranged according to routes in the city, and before the collector leaves the office, a record is made of the amount due. If a settlement is made on presentation, the fact is noted. The object of this is to give the collector a complete record of all collections due in his own district. If any collector receives an appointment to receive a payment at a certain date a memorandum is made and filed in the office. The importance of the collector's calling on the date set is urged very strongly, in order that the subscriber may have no excuses. In the middle of the quarter subscribers who have not paid accounts due receive a written demand for settlement. This is followed a little later with a written request that payment be made on a certain date, in order to insure continuance of the service. During the year of 1905 there were discontinued 55 subscriber's telephones connected with the Grand Rapids exchange for non-payment. From Jan. 1, 1906, up to the present 11 telephones were discontinued.

In the collection department there is located a switchboard to which delinquent subscribers' lines are connected. If a subscriber does not pay his account his line is connected on this board and he is advised that the account must be settled before further outgoing service can be furnished. If within a reasonable length of time the account is not paid the instrument is removed from the subscriber's premises.

It is customary, after a subscriber's instrument has been discontinued, to present the bill for payment, and if immediate settlement can not be had the account is referred to the local credit company for collection. In this way we have been able to realize considerable on accounts where our regular collectors could not obtain settlement. The Citizens' company has charged off as uncollectable for the year 1905, at the Grand Rapids exchange, a little less than one-third of one per cent. of the total rentals and tolls charged, which we consider a very gratifying record.

Weekly review meetings are held, in which the collection department and active management of the company participate. The accounts due are gone over very carefully and notations made regarding the subscribers' promises, etc. We have found these meetings to be worth their weight in gold, as the collectors appreciate the courtesy of meeting with the management of the company, and it always gives them good encouragement to force collections. At one of the monthly evening meetings, the general manager of the company spent the evening in answering questions put to him by the collectors. These questions consisted of numerous inquiries made by subscribers regarding miscellaneous information desired by them.

As a rule, it is usually the same subscribers who are in arrears time after time. We decided some time ago to take up these special cases and force the prompt payment of rentals. The collectors were requested to hand in a list of those subscribers, who were notified that they would have to pay promptly. We have found this a good plan, as a large per cent. of the subscribers who formerly did not pay until the latter part of the quarter are now paying promptly in advance. This has all been accomplished without arousing any antagonistic feeling on the part of the subscriber toward the telephone company. Considering the 17 per cent. increase in business in the last year, to-day the amount of outstanding accounts of the Grand Rapids exchange is lower than it has ever been.

Many telephone companies do not consider carefully the im-

*Read before the convention of the Michigan Association.

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portance of the collections. Schools for the education of operators and solicitors are maintained by certain companies; why not have a school for the education of the collector, who comes closer to the subscriber than the management of the company? If you expect good results, you must keep constantly in touch with the collections and offer encouragement in the way of a fair salary to collectors. Usually, when an employe makes a success in the collection department his services are considered valuable for this department only, and he is not given an opportunity to grow up in the electrical or mechanical end of the business.

Good results in forcing collections have been obtained in the outside exchanges by the Citizens' Telephone Company and a card record system is kept of the collections. These are compared by the general manager, and if any indication is shown that the collections are going behind the matter is immediately brought to the attention of the local manager. We have also tried the experiment of sending to the outside exchanges an experienced collector to take up delinquent accounts and have found this a good plan. The local manager, as a rule, is inclined to be lax in forcing collections, as there are numerous other duties that demand his attention, and also the deadly, dull routine of collections and making of reports are not very inviting duties. I recall where we had an exchange of about 75 telephones and a commissioned manager in charge. We impressed on him the importance of forcing collections and he would always respond by stating, "the subscribers did not care to pay in advance." Recently the management of this office was changed and a large number of subscribers added, and a salaried manager assumed charge of the office. The bills were presented promptly and about 95 per cent. of the collections were made during the first month of the quarter. Local managers are now asked, "What is the amount outstanding?" instead of, "how many subscribers has your exchange?"

This all has a tendency to show that if you have the tenacity to stick to it, you can force the collections. We all realize that it is a great deal easier to collect rental and toll charges when they are due than later, and this is especially true of toll bills. If allowed to accumulate, it is harder to force the collections, as the subscribers, as a rule, seem to consider that the telephone company has an abundance of capital and it not in great need of the money. We have spent some time in educating the collectors as to how the toll calls are recorded and forwarded to the line operators and the routine work, in order that they can easily discuss with the subscribers any question regarding a toll charge that may arise. Often the subscriber claims that the call did not originate at his telephone, or that he was positive that he had not talked overtime, as charged.

In the collection department is placed a blackboard, on which is noted the amount of money collected in the same period for the previous quarter, also the names of each collector. The amount collected each day by every individual collector is posted opposite his name and each morning the collectors know if the collections are up to the previous record for the corresponding day. It is surprising to know with what interest the collectors' eyes scan the board when the amounts are posted. This stimulates the activity of the collector to reduce the outstanding account and promotes a healthy competition between collectors that brings good results to the company.

HOW TO MAKE A MULE GO.

DID you ever drive a mule? If you have you know some things about perversity and also how to become resigned to fate. Since the very earliest times the mule has been recognized as the personification of stubbornness, and no means was ever discovered to overcome this peculiar brand of cussedness until just a week or so ago. Next time you look at a telephone see if you can note any particular part about it that looks as if it could come out first best in a contest with a mule. It does not look so, but nevertheless it's a fact that the means to fill a long felt want in the mind of the mule driver has been discovered to be the brand with a crank attached.

Down in West Virginia near Clarksburg two linemen were driving two excellent examples of the mule family along the country road when without a word of warning or even so much as a bat of a tail the wagon came to a dead stop, almost throwing the unsuspecting occupant over the dash board. A careful examination failed to unearth any reason for the mulelike action, and all pleadings were in vain. The mules intimated as plainly as they could that the exact spot upon which they stood suited them very well as a resting place, and they didn't intend to move. Then, while one kept his weather eye open for trouble and his hind legs in a particularly effective position to ward off any unseeming incivilities from the rear, Mr. Mule No. 2 dropped his head as far as he could and went off into a pleasant sleep, dreaming of a mule heaven. Meanwhile the two linemen who had been up against a similar state of affairs before were racking their brains to discover some means to get home before the shades of night should fall.

Suddenly an idea came to one of them. Without saying a word he cut two lengths of copper wire, and getting down from his seat, ran the wires along the mules' backs and sides under the harness and connected the two ends to a telephone in the wagon. Then he got a pail of water from a nearby homestead, explaining that the mules were thirsty and hot and needed a bath. Getting up into the wagon the water was carefully poured over the backs of the beasts, who all unsuspecting of the dire calamity that was to overtake them, dozed on. With a last admonition to the driver to sit tight and hold fast, he got into the body of the wagon and started to ring. Like a shot from a gun the two mules leaped forward, nearly breaking the harness, and fled from the spot at breakneck speed. Never before had they experienced the like, and what their feelings were can be left to the imagination. Mile after mile they sped till at last thoroughly exhausted they allowed the driver to bring them to a stop with the tongue of the wagon thrust into a bank. Ever since that time it has been found necessary to blindfold them when loading up so that they can't see any telephones being put in the wagon and all the driver has to do to get them going some is to say "telephone."

DOUBLE TAXATION.

THE Court of Appeals of Kentucky has held that where a telephone company is paying a franchise tax, a municipality cannot impose an occupation tax as a revenue measure for the transaction of business of such corporation. This decision was made in a suit brought by the Cumberland Telephone & Telegraph Company against the Police Judge of the city of Eminence, in which the company was operating a telephone exchange, to prohibit the enforcement of an occupation tax. The charter of the city conferred power "to impose and collect license fees and taxes . . . on all franchises, trades and occupations," but "not in conflict with the constitution or laws of this state or the United States." The city council enacted ordinances imposing a license fee of $50 per annum upon the business of handling for pay telephone messages in the city. Telephone companies are required to pay to the state a franchise tax as well as being required to pay a franchise tax to each county, city or town in which it may be exercised, if such municipality imposes an ad valorem tax. The court held that the franchise tax authorized by this state law is intended to cover all the intangible property of the corporation as represented by the earning value of its capital employed in the specific business in which it is engaged. The court held that the franchise taxed by the state covered the same property as the license fee attempted to be levied by the city, and that the city's license fee or occupation tax was intended as a revenue measure, and hence was void. This occupation tax was held to be a violation of the constitutional provision requiring uniformity of taxation. It was also double taxation. Although the general assembly may delegate to cities the power to impose license fees on franchises, the constitution does not contemplate that a city may be authorized to tax the same privilege twice for the same year as against the same owner.

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QUERIES

CONNECTIONS FOR STARTING INDUCTION MOTORS. (688.)

Will you please explain the method of keeping the current in a General Electric induction motor at the proper value until the machine reaches its full speed at the time of starting? C. B. W.

Induction motors manufactured by the General Electric Company are built in two forms, known as Form K and Form L, signifying respectively the squirrel cage and the resistance in the armature types, both of which are familiar to the trade. In both forms the field or stationary element is the same, the difference being in the armatures, which are interchangeable.

Because of its electrical design a squirrel cage armature type motor, if thrown directly on the line, would take a very large current at starting and, therefore, for motors of 7½ horsepower and above, a device known as a starting compensator is used to reduce the initial rush of current. This consists essentially of an inductive winding with taps and a switch, by means of which a reduced potential is impressed on the motor to bring it up to speed. With the switch in the starting position the arrangement is equivalent to a step down transformer and the product of the potential by current on the line is approximately equal to the potential times the current on the motor circuit.

Starting compensators of this character for two-phase and three-phase Form K motors consist of a core and windings, a terminal board and switch assembled in cast iron case, with an external operating handle. Perfect insulation of the whole mechanism is assured by filling the case with oil. Figs. 688c and 688b show respectively the connnections for a three-phase and two-phase Form K motor.

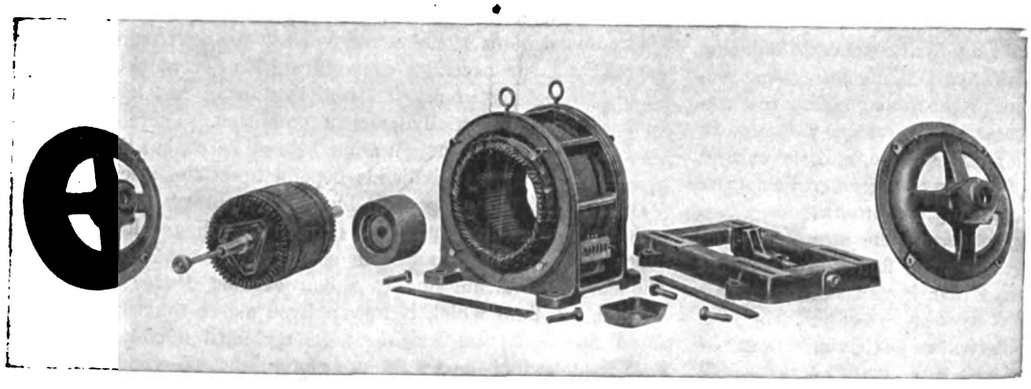

Fig. 688a. Parts of General Electric Company's form L induction motor.

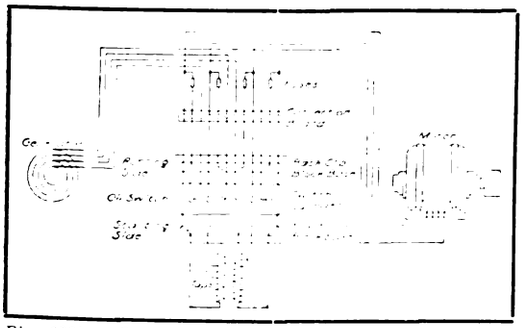

Fig. 688b. Connections for starting compensator for 2-phase form K. induction motor.

In the Form L motor the armature has a regular winding in which there is included a resistance to keep down the starting current. This resistance consists of a series of practically indestructible cast iron grids mounted within the armature edge in such a way that suitable contact fingers slide directly on each. This gives a large number of contact points with comparatively no sparking. The operating mechanism consists of a shank sliding in the hollow shaft of the motor and having a loosely mounted handle at the end so that the resistance may be cut in and out while starting the motor by pushing or pulling this handle. This makes a compact and efficient arrangement with no outside resistance boxes. The general arrangement of the parts of this type of induction motor is shown in Fig. 688a. On starting the motor all the resistance is in, and as the armature comes up to speed the handle is pushed in gradually, cutting out the resistance and allowing the motor to receive its rated current.

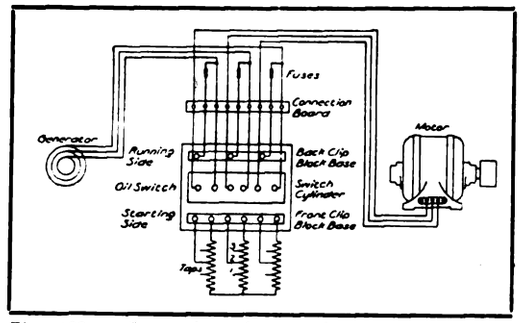

Fig. 688c. Connections for starting compensator for 3-phase form K. induction motor.

MOUNTING POWER MACHINERY. (689.)

Will you please tell me how the power apparatus for a telephone plant, such as generator, motor, and gas engine may be securely clamped to brick piers? R. G.

The iron bases of the machines are provided with drillings at each of the four corners to receive bolts projecting upwards from the brick piers. The proper method of procedure is to first locate the bolts in the appropriate places, then to lower the machines into position, allowing the bolts to slide into the holes provided for them.

To locate the bolts it is necessary to make an accurate layout of the positions which will be occupied by the machines upon the piers in order to secure correct alignment of belts or shafting.

In doing so it is better to transfer the dimensions directly from the bases of the machines themselves than to rely upon measurements, as even a slight error will make the work extremely difficult, or be liable to throw out the adjustment of running parts. This transfer may be made in the first place from the machine base to a large piece of paper, showing the entire outline of the base, with the location of the bolt holes. It is then an easy matter to mark on the base of the pier the correct positions of the bolts. They should be put in position, with the heads set in cement, and flanged washers, three or four inches in diameter slipped down to the heads, with flat side up. These washers are to distribute the pressure over a considerable surface of the brick when the nuts are turned down. After the bolts are in place the brickwork may be built up around them, holding them firmly in an upright position. This arrangement provides a firm foundation, larger in size than the base of the machine, and with bolts projecting upwards at places corresponding to the holes in the bases. Preparations of this nature, when accurately carried out, provide for the correct location of machines and for holding them firmly in position.

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THE EDITOR'S PAGE

REMOVAL OF OFFICES.

CONTINUED progress and growth has forced THE AMERICAN TELEPHONE JOURNAL to increase the amount of office space at its headquarters in New York. At the same time that the necessity of securing more room was recognized it was determined to seek a more convenient location. The offices are now at 100 William street, New York City, where THE JOURNAL is in a position to more easily handle the work involved in the conducting of a periodical dealing with the features of a rapidly expanding industry.

THE LINE OF PROGRESS.

STATE conventions of the Independent Telephone Associations have been especially notable this year for the attention given to features of operation, in addition to hearty enthusiasm and the general recognition of the advantages of united effort. These latter features have been important in encouraging each individual to put forth his best efforts to acquire new business. Now the Independent companies, operating systems which in combination have a far greater number of telephones in service than their competitors, may well say that even their comparatively weaker members are started on a firm basis, and increase in size is certain to proceed rapidly. The result is that managers are beginning to regard the question of advancement as being pretty definitely settled, and a matter which demands consideration in detail rather than as a broad proposition. The main question now is that of striking the fastest pace that can be made in the matter of giving prompt and efficient service, and the cutting down of the cost to the telephone company of giving this service to the very lowest terms. It is thoroughly obvious that these two conditions lead in divergent directions, and the man who tries to follow both lines to the limit will soon find himself in the same predicament as the locomotive that is run out on a pair of spread rails.

If the limit is not attainable at the end of both, there is nevertheless somewhere a point where a justifiable balance may be obtained, and it is the determination of this point which represents the next great practical problem to the Independent telephone men. In fact this problem is presented in the same way to their rivals. The Bell companies, by means of a centralized organization, have been able to develop plans for systematic consideration of the subordinate problems in this main proposition.

It is obvious that the principal opportunities open to the Independent men at present lie in their meetings in conventions. In the State conventions points of view with regard to certain features of operation, maintenance and construction have reached a more or less definite form. Operating conditions in various parts of the country are so different that the opinions of many different sections do not by any means come into perfect agreement. Yet all these opinions, reached after careful consideration, careful experimenting and more or less discussion, must have considerable merit. The reason why they are not in perfect accord is rather on account of varying conditions of operation and partial lack of information which makes them differ through lack of completeness, rather than through essential errors.

The object of the consideration, which will be given to the operating features at the great convention which will be held in June, is primarily to enable each man to so round out his information as to make it easy for him to look at a proposition from all sides and judge it broadly. The benefits to be gained will not only be sufficient in themselves to make attendance worth while, but to justify the most careful consideration in advance. No man can afford to conduct experiments in all branches of the business. But there are few indeed who cannot carry one idea far enough to form opinions about its value. It is the exchanging of these experiences at the June convention of the National Interstate Telephone Association in Chicago which will help the Independent managers to meet their complex operating conditions with renewed activity and broader judgment.

MAINTENANCE OF LINES.

WITH the arrival of warmer weather opportunities for improving the condition of his open wire plant are being considered by every exchange manager. At this season the looseness of the soil causes many weak points in construction to be evident for the first time. An occasional pole is sure to lean in response to a pull which a few months ago caused no deviation from the proper and exactly upright position. A guy placed where it belongs to-day will be much more easily attached, and prove to be a far better investment than one run to the same pole later in the year when an unpleasant tendency has developed into a positive defect.

In some sections of the country disastrous sleet storms have occurred, and the necessity of restoring service quickly at a time when the making of repairs is most difficult has left many circuits in only a partially efficient condition. There is a strong tendency to let well enough alone in such cases, but the man alive to the fact that his dividends depend upon the efficiency of his service is not being deceived by any temporary safety.

A few weeks from now the growth of foliage along countless miles of wire throughout the country will tend to reduce the efficiency of transmission to a considerable degree in many localities. A limb which is now a little above the wires may sag from the additional weight of foliage until a contact is made, and the shunting effect of a number of leaf contacts is much greater than that of the bare limbs. Here, again, a little foresight will prevent the giving of business to a competitor who is able to give a service having a little higher transmission value. A swinging cross or ground which comes in on the line at all is far from unlikely to occur at a time when the most valuable subscriber is trying to talk over those wires to a town a hundred miles away.

Such troubles may not be on the lines now, but they are latent and their appearance is only a matter of time as long as the unpleasant conditions which produce them are not removed. They only await some period of unusually severe weather during the summer to make themselves felt. When they do come in, if they are not looked out for at present they are likely to appear in a group that will make the tax on the resources of the exchange rather severe. The consequent reaction upon the service and annoyance to subscribers is one of the most disagreeable of the minor difficulties with which an exchange manager has to contend. As testing by electrical methods can only deal with fixed conditions and established troubles, there seems to be but one remedy. This is inspection by a careful and experienced man. The companies which make a practice of going over their lines at this season and making thorough repairs find that it brings about results in the way of reduction of maintenance expense and improvement in the service which make its cost a negligible quantity.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

WAIVER OF WRITTEN NOTICE OF RENEWAL.

The contracts that we make with subscribers contain a provision for a written notice by the company before the telephone can be removed from the subscriber's residence or place of business. One of our subscribers fell in arrears for his rent, and we notified him over the telephone that the instrument would be removed from his premises unless he at once paid the amount due for its use. He answered that the company might do as it pleased, but when we sent a man to take the telephone out, he refused to let it be done. Is it necessary for us, under these circumstances, to give a written notice? We have already given the written notice to save time, but would like to know the law in the matter. F. M. S.

THE subscriber by stating that the company might do as it pleased waived the provision in the contract for a written notice of removal. It was therefore unnecessary to give him written notice, and the company had a right to take out his telephone. In case you had done so, and he had sued you for breach of the contract, you would have been fully protected. A case bearing on the subject is Malochee v. Great Southern Telephone & Telegraph Co., 22 S., 922, 491, La. Ann., 1690.

LICENSE FEE UNDER LAWS OF UTAH.

The city council has passed an ordinance levying a license fee of $5 on each telephone instrument operated by all telephone companies in the city. What we want to know is whether the company can tax us in this way, and whether any distinction should be made between telephones that are used entirely within the city and the instruments on our long distance lines that run out of the State. C. A. J.

UNDER sections 89 and 289 of the Compiled Laws of 1888, cities are authorized to collect a license fee on various occupations, etc. Under this section a city council is authorized to pass an ordinance to raise revenue, levying such a license fee as you describe upon each telephone instrument used exclusively within the limits of the city for local business, and for which a rental charge is made. The license fee would not be valid, however, upon instruments used for carrying on the interstate business of the company. City of Ogden v. Crossman, 53 Pac., 985.

ASSESSMENT OF TELEPHONE LINES IN IDAHO.

WM. J. McCONNELL brought suit in the Supreme Court of Idaho to inquire into the validity of the revenue laws of the state. He contended that sections 74 to 83, inclusive, of the revenue act of March 22, 1901, in so far as they attempt to authorize the state board of equalization to fix the valuation of telephones and their lines and property belonging thereto, are unconstitutional and void. The court held, however, that under the provisions of the revenue law, the state board of equalization was authorized to fix for taxation the value of telephone lines, etc., and property belonging thereto. The court also decided that it was not authorized in the suit to pass upon the constitutionality of an act upon the application of a private person to protect his private rights. This was due entirely to the form of the suit, which was a writ of review. McGonnell v. State Board of Equalization, 83 Pac., 494.

NEGLIGENCE IN LOCATING POLE IN HIGHWAY.

SOME time in 1903 a party of twenty-seven young ladies and gentlemen drove a distance of eight or nine miles in Butler County, Pa., to attend a social function at the latter place. The vehicle was a farmer's ordinary hay wagon, fitted up with a rack, and was drawn by two horses. On the way home the wagon came in contact with a telephone pole and one of the young ladies was struck by the pole, knocked from the wagon and injured. Alleging that the company was negligent in placing the pole upon the travelled portion of the road, she brought suit against the telephone company and recovered a verdict. The laws of the State granted telephone companies power to construct their lines along and upon the public highways, but its lines should not be so constructed, says the statute, as to incommode the public use of the road. The court held that the legislature did not intend by this legislation, to deprive the public of the use of the highways for any proper and reasonable means of travel, but intended that the franchise should so be exercised in subordination to the rights of the public on the roads in the State. The company contended that the driver of the wagon was guilty of contributory negligence which should be imputed to the plaintiff in the case. The driver of the conveyance was not employed by the plaintiff and it was therefore held that she was not responsible for his negligence and was therefore entitled to recover. Little v. Central District & Printing Telegraph Company, 62 Atl. 848.

QUESTIONING THE PLAN OF CONSTRUCTION.

AN electric company permitted a telephone company, for a consideration, to use one of its poles on which there were 11 cross-arms supporting 130 telephone wires. The cross-arms were supported by iron braces. The electric light wires were attached to the faces of the seventh and eighth cross-arms and extended across the lines of the telephone wires. They were held in place at the cross-arms by the use of porcelain knobs, and their insulation was by cotton covering, ordinarily used for inside wiring. The wires had been in use seven years and the covering of the wire on the seventh cross-arm was worn off at its point of contact with an iron pole which passed through a brace. Persons climbing the wires were accustomed to use the braces as supports in climbing. A young man in the employ of the telephone company was last seen alive when at about the fifth cross-arm. He was killed by an electric shock and his body was found on the wires supported by this cross-arm. There was no direct evidence that he was killed by coming in contact with the iron brace. In a suit by his mother for damages, the court held that direct evidence was not essential and that the cause of death might be inferred from the location of his body with relation to the dangers to which he was exposed. The electric company operated two lines of wires extending from its main line to the cross-arms of the pole. The court held that the placing of the wire on the cross-arm was a part of the plan of construction, and that testimony as to the construction was properly admitted. Morgan v. Westmoreland Electric Company, 62 A., 638.

INJURIES FROM COMPANY'S NEGLIGENCE.

IN the Circuit Court of Buchanan County, Mo., a boy by his next friend, brought suit against the Missouri & Kansas Telephone Company and recovered $1,500 damages on account of personal injuries sustained as a result of the company's negligence. The boy was on his way to school, when his attention was attracted by some linemen who were employed in making repairs for the telephone company upon some overhead wires. The boy asked and obtained permission from one of the workmen to take a piece of wire lying near the base of the pole upon which the workmen were busy. As he started to pick it up the workman attempted to throw a cleaver, a heavy edged tool, to a lineman who was near the top of the pole making repairs. The lineman failed to catch the implement, and it fell, striking the boy and inflicting serious injuries. The company asked for a reversal in the Kansas City Court of Appeals, because the plaintiff was permitted to show by testimony that it was customary to pass a tool from the ground by having it pulled up by a line. The court held that such evidence was proper, even though no custom was pleaded and affirmed the judgment. Brunke v. Mo. & K. Telephone Co., 90 S. W., 753.

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IN THE OPERATING FIELD

INDEPENDENTS OF FIRST KANSAS DISTRICT HOLD MEETING.

ORGANIZATION of the exchange owners of the first Kansas district was given a substantial impetus as the result of a meeting recently held at Atchison. Members of this district operate exchanges in Nemaha, Brown, Doniphan, Jackson, Atchison, Jefferson, Leavenworth and Shawnee counties.

The house was called to order by C. E. Betts of Atchison, president of the district association, and Mr. J. A. Zimmerman of Valley Falls was made temporary secretary.

The first thing on the program was a talk by the chairman, who explained the object of the meeting, and also the result of the state meeting held in Wichita on Jan. 22 and 23.

Mr. Betts stated that the object of this association was to form a closer working agreement among the exchange owners of this territory, to better the conditions of the service, to arrange for additional toll lines throughout this territory, and many other things along the line of promoting the welfare of the Independents in the state of Kansas.

Next in order was a talk by the traveling secretary of the Missouri Independent Telephone Association, James F. Barnett, of Rutledge, Mo., in which he explained his methods of organizing and the gathering of statistics. He also explained the way in which he carries on his work among the farmers and makes them friends of Independent interests.

Dr. J. J. Newell, of St. Joseph, Mo., then spoke of the close relations existing between Independent operators, and the advantages which come from loyal co-operation.

Theodore Gary, of Macon, Mo., vice-president of the National Inter-State Telephone Association, outlined the policy of "What are we in the business for?" He demonstrated very nicely that the main thing in the telephone business was to receive proper compensation for the labor, brains and money invested in successfully building up the Independent systems. He said that while he believed there should be a neighborly feeling between all the operating companies, and closer relations, business should not be secured unless there was some money to be made out of the new business after it had been acquired.

O. M. Anderson, of Huron, Kan., gave a very interesting talk in regard to the relation of the Independent operators to their patrons.

J. A. Zimmerman, of Valley Falls, Kan., explained his feeling that no Independent operator could afford to sacrifice his principles in selling out to his competitors, thus withdrawing his support from the men who have been the means of aiding him in his position, and making him a successful telephone man.

The committee on by-laws and constitution made a report, and its recommendations were adopted.

At the afternoon session C. J. Myers, of Kansas City, spoke on the subject of "Toll Line Prospects, and Future Extensions."

At the time of adjournment the feeling was strong that the members had participated in a most helpful and interesting meeting.

HOME COMPANY OF ONEONTA, N. Y., EXPANDS.

WHEN the extensive improvements to the plant of the Home Telephone Company of Oneonta, N. Y., which are now under way are completed, there will be upwards of five thousand telephones in service. Numerous plants which have been receiving their long distance service over Bell lines have discontinued and will in future connect with the Home company. Among the towns benefitted are Richfield Springs, East Springfield, Cherry Valley, Cooperstown, Hartwick, Edmeston, New Berlin and Morris. Such places in Otsego county as have no Independent connections will be furnished service as soon as possible and a number of new exchanges will be built.

At present there are two thousand subscribers to the Home Telephone Company's service, and this number is being rapidly increased by secessions from the Bell lines.

INCREASED CAPITAL INSTEAD OF SELLING OUT TO BELL.

WHEN a proposition made by the Bell company to the Hilton (N. Y.) Telephone Company for the sale of its property was brought to the attention of the stockholders at a recent meeting, it was emphatically turned down. As a further evidence of the intention of the Hilton company to remain Independent, it was decided to increase the capital stock from $8,000 to $15,000, in order to provide funds to expand the plant to meet the ever-increasing demand for Independent service. The present capacity of the plant will be increased at once by additional switchboard facilities and new lines. During the coming summer all the territory within the vicinity of Hilton will be covered and new long distance and toll lines are to be built to connect with the other Independent systems in this part of New York State.

NEW EXCHANGE FOR GALESBURG, ILL.

RAPID development, added to a desire to give its patrons the best service possible, were the reasons for the construction and equipment of the new exchange of the Galesburg Union Telephone Company. The building is a two-story structure of brick and stone, with a spacious basement. On the lower floor are the offices of the company and the upper floor is occupied by the switchboard, which has an ultimate capacity for 10,000 lines, and the operator's quarters. The power equipment is in duplicate and every precaution has been taken to prevent a breakdown from any cause. The total cost of the building and equipment is in the neighborhood of $50,000, of which the switchboard cost $20,000.

AN EXCELLENT EXAMPLE OF PROSPERITY FURNISHED BY AN OHIO COMPANY.

FINANCIAL considerations furnish sure indications for judging whether a company's growth has been healthy and rapid.

An excellent document pointing to existence of this satisfactory state of affairs is the recently issued prospectus of the Newark Telephone Company of Newark, Ohio.

This company was organized in December, 1894, with an authorized capital of $20,000. The rapid growth of the business, however, soon necessitated an increased capitalization which has been added to from time to time until it at present amounts to $150,000. Of this amount $60,000 is common, $40,000 preferred stock redeemable and $50,000 preferred stock absolute. The entire issue of common stock has been sold for the past five years and is now listed on the Columbus Stock Exchange at 115. The redeemable preferred stock which draws 6 per cent. interest is to be taken up at the end of ten years. The absolute preferred stock is now being placed on the market and has already nearly all been sold. It draws a 6 per cent. dividend, is non-taxable, and the holder has the same voting privileges as the holder of common stock.

The plant has a bonded indebtedness of $40,000, but this is being reduced by a yearly payment of $5,000 from the sinking fund, the first payment having been made on April 1, 1905. There

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The Largest Telephone Companies Doing the Largest Business Install

GRAY AUTOMATICS

50 STYLES YOU SIMPLY DROP IN THE COIN CATALOGUE 1908

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—A 225 telephone exchange located in a good business town in a rich agricultural district in Illinois. Good paying property and growing rapidly. Price $4,500. Address Box 598, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 598

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—By a large telephone factory in Chicago, young men not over 22 years of age, preferably graduates of high schools or technical schools, to enter an apprenticeship course and be trained to install and operate modern central office equipment. Address, stating age, education and experience, Box 582, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 582

WANTED—Position as Exchange Manager. Fully competent to do all kinds of switchboard and telephone work. Five years' practical experience. Address Ernest Still, Lock Box No. 6, Creighton, Mo. 592

WANTED—Position in auditing department. Capable of installing system of accounts. Also, position for experienced contract agent and adjuster. Address Box 601, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 601

WANTED—At once, two first-class Independent solicitors for work in Missouri. Salary at beginning depends upon references. Address Box 409, St. Joseph, Mo. 602

WANTED—Position as manager in exchange of 1,000 subscribers or less. Have had five years' experience in telephone business and am graduate of International Correspondence Schools. Best of references. Address Box 597, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 597

WANTED—Continued

THE point is just this! Are you dissatisfied with your present position—or have you an employee who is unsatisfactory—in either case, where could you turn better for relief than to a corps of trained employment experts? We have secured better positions for thousands of men, and have supplied thousands of employers with competent men. Why hesitate? Booklets can be secured for the asking. Hapgoods, Suite 511, 309 Broadway, New York City. 464

WANTED—Young traveling salesman by well known concern making high grade line of interior apparatus and supplies. Fair salary and traveling expenses to start. Give full particulars as to qualifications, experience, age, habits and references. Address Box 603, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 603

WANTED—Position wanted by an all round telephone construction man who is thoroughly competent, sober and reliable. Best of references. Have completed course in telephone engineering. Address Box 587, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 587

WANTED—Position as Auditor for Independent telephone company. Experienced in telephone accounting during construction and operation. Best of references. Address Box 595, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 595

WANTED—Position with telephone company by young man with automatic and manual experience. Best of references. Address Box 605, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 605

WANTED—Position as manager of common battery exchange by capable man with ten years' telephone experience. Address Box 606, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 606

WANTED—Manager for Independent operating company. One who is at present employed in a like capacity. State references in reply. Exchange of 2,000 subscribers. Address Box 607, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 607

WANTED--A few first class cable splicers with a large telephone company. Good chances for steady work. Good wages. No strike. Address Box No. 604, care The American Telephone Journal, 100 William St., N. Y. City. 604

A Secret Calling Device

Can be attached to any bridging generator. Will work on both metallic and grounded lines. No push button. No extra wiring. Complete device, 50 cents each

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is not a dollar's worth of watered stock in the entire capitalization; in fact a large proportion of the earnings have been reinvested in the plant, which is in a first-class condition.

The equipment is central energy and the major portion of the wire plant is cable, which reduces the maintenance charges to a minimum.

At the end of December, 1905, the company had 2,085 subscribers. For that month its gross earnings were $3,488.59, and net earnings $1,820.92.

It is worthy of mention that since 1902 the gross earnings have been per month increased by about $2,300; the expenses for a like period have only increased $1,000, so that the net gain is more than $1,300 per month.

The building up of this extremely satisfactory condition is due to the low charges for maintenance, and especially to the high point of efficiency which has been attained in operating, under the direction of C. E. Hollander, who has been manager of the exchange for nearly four years.

Present indications show that upwards of 1,000 new subscribers will be added during the coming year. New cable to the extent of 3,500 feet will be installed and other improvements made to keep up the high standard of service. The officers of the company are H. Swisher, president; Edward Kibler, treasurer; J. C. Brennan, vice-president; C. H. Spencer, secretary.

GOOD FINANCIAL SHOWING OF KEYSTONE CO.

FROM the February statement of the Keystone Company of Philadelphia (including the Keystone Telephone Company of New Jersey and the Keystone State Telephone and Telegraph Company of Pennsylvania), which has recently been issued, it is possible to show a comparison between the earnings and expenses for that month and the eight months previous, which portrays a healthy financial condition. The respective items are as follows:

	February.	Eight mos.
Gross	$67,533	$535,042
Net	30,897	242,703
Renewal reserve	6,611	49,361
Charges	16,667	138,193
Surplus	7,619	55,149

PIANO TUNED BY TELEPHONE.

WHEN it comes to novel feats of any kind Indiana always is found in the lead. It is said that the late ex-President, Benjamin Harrison, was the first to acknowledge the execution of a deed of conveyance over a telephone. Recently a man committed a misdemeanor in Terre Haute and fled to Illinois, where he was arrested. Rather than return to Indiana for trial he conducted his own defense over the wire, was found guilty and paid his fine, all by telephone.

The novel feat of tuning a piano by the use of this method of annihilating distance, however, remained for M. J. Archer, a piano tuner of Wabash, Ind., to accomplish. Some time ago Mr. Archer sold a piano to Mr. Thos. Pilkington at South Bend. Miss Pilkington called Mr. Archer up and advised him the piano needed a tuning. She was asked to sound the instrument, which was near the telephone. The tone was transmitted clearly to Wabash, and directions were given which enabled her to change the tension. These directions were carried out and the instrument repeatedly sounded until it was perfectly tuned and the tones all normal.

CONSOLIDATED OF PENNSYLVANIA LEASES SEVERAL SYSTEMS.

AT a recent meeting of the directors of the Consolidated Telephone Companies of Pennsylvania, it was decided to lease the Easton & Bethlehem Telephone Company, the Warren Telephone Company and the United States Long Distance Telephone Company, operating at Bethlehem, Easton, Phillipsburg, Alapha, N. J., and territory surrounding these towns in Northampton and Warren counties. These companies have 250 miles of open wire lines and 50 miles of cables, with about 1,000 telephones in operation. The Consolidated proposes to develop the properties rapidly and to have at least 3,000 subscribers within a year's time. Long distance facilities will be increased and good local service made a feature. It is also proposed to greatly extend the rural line service.

The lease is for 999 years. The Consolidated will pay rental and the companies will take care of their bonds. The plants are equipped with central energy selective systems of the latest type. The Consolidated Companies are making great strides in adding to their territory and connections to long-distance points.

MEETING OF INDIANA TELEPHONE MEN IN THE SECOND DISTRICT.

THE first meeting for members of the Indiana Independent Telephone Association in the Second District was held in Ft. Wayne on April 5. This district is composed of the ten northeastern Indiana counties in which Independent development has been rapid and substantial. Vice-president W. L. Mueller presided and Elmer Popp was elected secretary. Nine new companies were admitted to membership, making twenty-seven companies, all of which were represented in the meeting. President Mueller announced that he would appoint an executive committee consisting of one member from each county.

W. S. Vivian, president of the Independent Telephone Clearing House of Michigan, was present and addressed the meeting on the subject of "Clearing-house"methods. Mr. Vivian described in a minute and interesting manner the operations of the clearing-house, and pointed out the many advantages that had been derived from it in his State. The members were highly pleased with Mr. Vivian's talk, and exhibited their interest in the subject by asking numerous questions. It was then decided that the Second District would adopt the clearing-house method. A vote of thanks was given to Mr. Vivian for his attendance and instructive address.

A warm discussion was had on the proposition to cut off from all companies having any connection with the Central Union Telephone Company. Had it been put to vote it would have been carried almost unanimously, but it was finally decided to defer action on the matter until the State convention at Indianapolis on May 17 and 18.

A general exchange of views and experiences pertaining to operating telephone systems was had, and many interesting and instructive incidents were related. Although this was the last district to organize, the interest manifested and the attendance clearly demonstrates that northeast Indiana is alive to the interest of Independent telephony.

FARMERS' COMPANY IN WASHINGTON EARNS EIGHT PER CENT.

APPROXIMATELY eight per cent. interest was earned on the common stock of the Farmers' Telephone and Telegraph Company of Wenatchee, Wash., during the past year. At the annual meeting of the stockholders the treasurer's report showed a gross income of $6,775.56 with a surplus of $1,672.93. The outstanding common stock amounts to $19,200.

This company was organized in October, 1903, to give telephone service to the town and surrounding country. From the start the growth was very rapid, there being at present 406 telephones in use besides seventy-three miles of metallic circuits. To enable the plant to be extended the directors were authorized to increase the bonded indebtedness to $15,000. Up to the present term the plant has cost $29,843.39. The officers elected were Z. A. Lanham, president; S. W. Phillips, vice-president; Arthur Gunn, treasurer, and H. C. Littlefield, secretary.

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requires the use of standard line hardware.

The Norton specialties conform with the most up to date ideas of design and are Standard.

It will cost you nothing to secure a copy of our catalogue and it will be worth a whole lot to you to know just what is considered the best in this particular line.

Patent Combination Messenger Hanger

If you are putting up cable, our **Patent Combination** Messenger Hanger is just the thing. Made from solid forged steel in three sizes for light, medium or heavy work, it is the best on the market. Always in stock either galvanized or japanned.

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Incorporation Rooords By-Laws, &c. Stook Cortificatos and Bonds?

We have new original Telephonic Designs showing the National Emblem in its beautiful colors.

Spring Construction Work WILL SOON BE UNDER WAY!

Have you the proper records to take care of this important work and safeguard your Material and Pay Rolls?
We furnish New or Old Companies with Complete Office Accounting and Filing Systems.

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TELEPHONE SYSTEMATIZING DEPARTMENT

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SECURITY POLE SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.
Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton.
You will be pleased on investigation.

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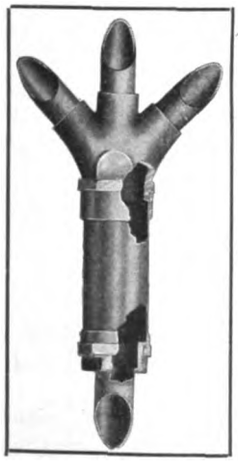

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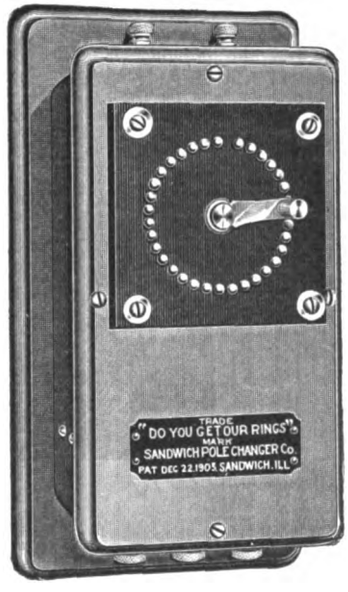
TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

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TELEPHONE PATENTS

WIRE SPLICER.

Datus C. Smith, New York, N. Y., patents (No. 815,754; dated March 20, 1906; filed August 15, 1904; serial No. 220,837) a wire splicing tool.

The object of this invention is to provide an improved means for splicing wires. To accomplish this result the inventor shows the different models embodying the same principle, one of which is shown herewith.

Referring to Figs. 1 and 2, a shank or handle is provided with

Fig. 1.

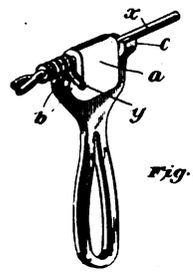


Fig. 2.

a flat part formed into a hook *a* and having notches or shoulders *b* formed on both sides of the hook. A notch *c* is provided at the other end of device.

In operation one wire *x* is placed in position beneath the hook *a* and over the hook *c*. The wire *y* to which it is to be spliced is then caught by one of the notches *b*. The two free ends in the direction of *b* are then grasped by any suitable tool and the splicer is revolved, which causes the wire *y* to coil around the wire *x*. To complete the splice the tool is disengaged and applied to the end of the wire *x* and the wire *y* in a similar manner.

TELEPHONE SYSTEM.

Elmer A. Terpening, Geneseo, Ill., patents (No. 814,571; dated March 6, 1906; filed September 6, 1904; serial No. 223,413), a telephone system.

The principal object of this invention is to provide a means whereby any party on a party line can call any other without signaling the exchange, or call the exchange without disturbing the bells of the other parties. Means are also disclosed whereby parties on one side of a divided circuit party line can call subscribers on the other.

To accomplish these results the inventor provides circuit changing switches in conjunction with a generator which can deliver either alternating or direct current at the sub-stations and a relay of a special and peculiar design at the exchange which responds only to direct current. This relay when actuated closes the local indicator circuit at the switchboard.

TELEPHONE SYSTEM.

Harold D. Stroud, Chicago, Ill., patents (No. 816,135; dated March 27, 1906; filed March 25, 1901; serial No. 52,788) and assigns by mesne assignments to the Stromberg-Carlson Telephone Manufacturing Company, of Chicago, Ill., a telephone exchange system.

In this invention means are disclosed for the inter-connection of subscribers' lines terminating at different switchboard sections. To accomplish this result the lines are terminated at two separate points, one the answering, the other the connecting position. Each substation is provided with a device which operates a selective instrument at the exchange to indicate to the answering operator the particular section in which the called for line is to be found.

As this patent is too complex to enable us to give a clear description in the space at our disposal, we would suggest that all parties interested procure a copy.

EXCHANGE SYSTEM.

Gustaf Lambert, Charlottenburg, Germany, patents (No. 813,560; dated Feb. 27, 1906; filed April 16, 1902; serial No. 103,123) a telephone exchange system.

This invention relates partly to those systems known as divided multiple and partly to the scheme of trunk interconnection between different exchanges.

The subscriber's instrument is provided with a back and front contact key adapted to close the metallic circuit of his line, or to make a ground connection on one side thereof. If he desires to talk with any subscriber whose line terminates at a different branch switchboard from his own or at a separate exchange he depresses the key according to a prearranged code and his line signal is displayed at the desired branch switchboard or at the trunk connecting position. This is accomplished by means of electro magnetic mechanism at the central office operating upon the step by step principle.

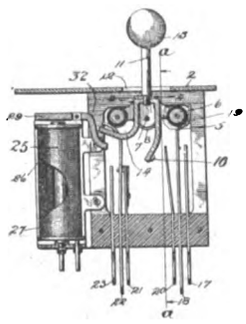
AUTOMATIC RINGING AND LISTENING KEY.

Albert Carliss, Chicago, Ill., patents (No. 815,405; dated March 20, 1906; filed June 20, 1901; serial No. 65,240) and assigns to the American Electric Telephone Company, Chicago, Ill., an automatic ringing and listening key.

This invention relates to that class of key in which the ringing movement is controlled by an electric magnet and which maintains the ringing circuit closed after the key lever has been released until the subscriber answers.

Referring to the illustrations 2 is a top plate to which are attached side plates 3 to support the key mechanism. Pivotally attached to the side frames is the rocking frame of the key, which carries, besides the spring actuated rollers 6, an irregularly shaped member 9.

Attached to one end of the key framework is magnet 25, which



is provided with an armature 29 having a downwardly and outwardly extending member 32 adapted to engage the projection 14 on the key lever.

In operation the key lever 13 would be moved in the direction to close the contacts 23, 22 thereby supplying ringing current to the line. At the same time the magnet 25 is energized and its projection 32 engages the projection 14 of member 9, thereby locking the key in position for continuous ringing. Upon the de-energization of the magnet 25 its armature releases the member 9, and the key returns to its normal position.

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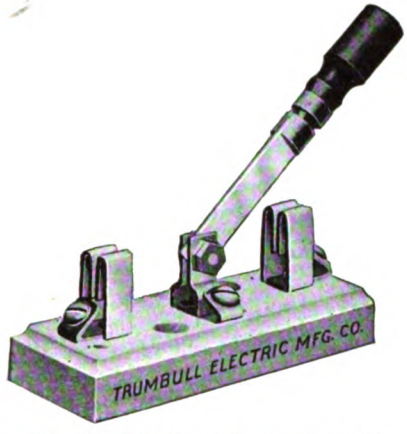

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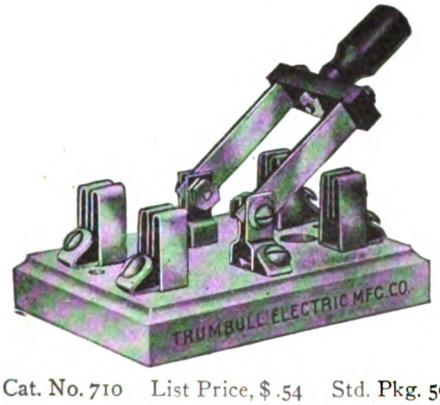

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Perfect Switches

About 99 out of every hundred porcelain switch bases warp in baking, and an ordinary knife switch mounted on a warped base will give about as good service as a bent balance wheel in a watch.

Because, to make perfect contact between the blade and the front clip, the front and rear clips must be exactly in line, and perpendicular to the base.

But on a warped base, the rear clips lean one way, the front clips another.

Instead of the blade entering the front clip parallel to the sides and making contact over the entire surface, the blade slants, and when it enters the clip, springs the sides away, thus touching only at the top and bottom.

It is this poor contact, and the resulting dissatisfaction of the ordinary switch that has brought porcelain base switches into such disfavor.

In our new switch, we have overcome all the faults of ordinary porcelain base switches.

The porcelain is the highest grade produced, and is as nearly perfect as possible.

The clips are prevented from turning by being held into depressions in the base by heavy screws.

Perfect contact is permanently insured by making the front clips self-adjusting, as shown in the illustrations.

The bend allows each side of the clip to adjust itself to the position of the blade, and make contact over the entire surface.

For convenience in attaching the wires, the binding contacts are raised from the base.

Being held under the HEAD of the screws, the wires are not cut or scored, and so firmly are they secured that a No. 14 wire will stretch and break without pulling loose from the switch.

These switches are remarkably durable and satisfactory, and are used exclusively by a number of the largest telephone and gas engine manufacturers.

Order a standard package and give them a thorough test—they'll save you lots of bother.

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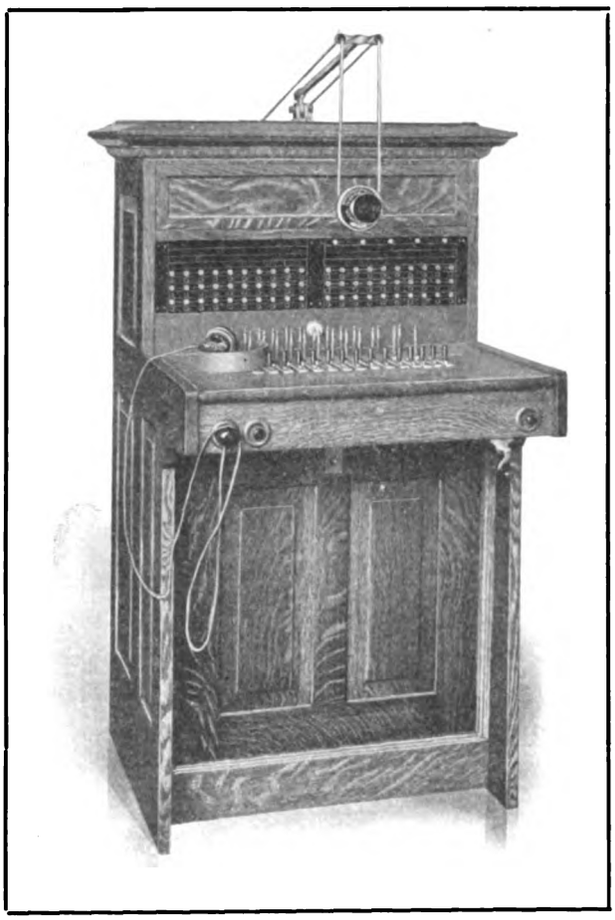
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A NEW BRANCH EXCHANGE CABINET.

IN many offices it is found desirable to have the switchboard operator act in other capacities, such as information clerk or door attendant. In such cases a low switchboard cabinet is found to be desirable as it permits the operator to look over the top without leaving her seat. The Stromberg Carlson Telephone Manufacturing Company of Rochester, New York, is manufacturing a cabinet having this characteristic feature, which is listed as No. A-2766, in bulletin No. 14. It occupies a floor space of 25¼ inches by 29½ inches and is 47 9-16 inches high. The key shelf is only 31 inches high, which makes it a very convenient board to operate. The finish is golden oak, which makes a pleasing appearance. The capacity is sixty-lamp line signals, five or ten main exchange trunks, ten central energy cord circuits, double lamp supervisory signals and one operator's equipment. The board is illustrated in the accompanying half tone, which gives a good idea of its general appearance. The company states that this type of cabinet is a standard for private branch exchanges of the class mentioned above, being much lower than the other designs of upright cabinets which it manufactures. Full information relative to this and other types of branch exchange switchboards can be secured by writing for bulletin No. 14.



New Branch Exchange Switchboard with Low Cabinet.

CHARLES A. BROWN, the well-known Chicago attorney, has recently announced that on the 1st of May he will move his office to 1550 Monadnock Block, where, with largely increased facilities, he will continue the practice of patent law in association with Lynn A. Williams, Charles J. Schmidt and Harvey L. Hanson.

THE CARBOLINEUM WOOD PRESERVING COMPANY, 126 Read street, Milwaukee, Wis., has recently received from the operating departments of the Utah Light and Railway Company the following: "CARBOLINEUM WOOD PRESERVING COMPANY:

"Gentlemen—Some six years ago we purchased from your company 5,000 or 6,000 ties treated with the 'Avenarius Carbolineum' process, and after being in the ground five years, we had occasion to see what the result of the treatment was, as they were placed in side by side with other ties. We found that the treated ties were in first-class condition, showing no signs of decay, while the untreated ties were two-thirds rotted.

"About two years ago the Consolidated Railway and Power Company consolidated with the Utah Light and Railway Company, and the engineer questioned the advisability of continuing the treating of these ties. After examining and seeing the results of the previous five years, he concluded that we should continue to have all new construction ties treated with Carbolineum; we have now somewhere near 30,000 or 40,000 ties in our road, and giving us entire satisfaction so far.

(Signed) W. P. READ, Supt. Railway Service."

LARGE TRANSFER BOARD AT CHEROKEE, IA.

THE New State Telephone Company of Sioux City, Iowa, has just placed an order with the Monarch Telephone Manufacturing Company of Chicago for a new switchboard for Cherokee, Ia. This switchboard is to have an ultimate capacity of 1,000 combined self-restoring drops and jacks, 100 cord equipments and five operators' sets. The board is to be made up in five sections, each having a capacity of 200 drops and jacks, twenty cord equipments and one operator's set. The Cherokee board is to be non-multiple, transfers being provided in all sections for connecting lines of one section to lines of the other sections. It will probably be the largest board of its kind in the State of Iowa and it shows that there are still strong advocates for magneto non-multiple exchanges for cities having less than 1,000 subscribers. The Monarch Telephone Manufacturing Company says that it is to furnish its most up-to-date and perfect equipment, and is to provide the finest board of this type that can be produced.

The cabinet is to be made in sections which are to match up with each other, so as to form a continuous unit when installed. The facilities for transfers, order wire circuits and other means of inter-communicating on the board, are to be of the most improved type. In the third operator's section are to be installed forty toll and farmer lines and in each of the other sections these toll and farmer lines are to be multipled. Any operator can secure a toll connection without connecting through a transfer circuit, which will facilitate the operation of the toll lines, and will make the service most efficient.

The New State Telephone Company owns and controls a number of exchanges in the vicinity of Sioux City in addition to the hundreds of miles of toll lines throughout the Northwest part of Iowa and the Eastern part of Nebraska. This Cherokee exchange will be designed for high grade service and the Monarch Telephone Manufacturing Company can be congratulated upon its success in securing the order for so important a switchboard.

With the board a complete lightning arrester and distributing frame is to be furnished. The equipment is to be installed in a new building which is now under construction.

THE STANDARD UNDERGROUND CABLE COMPANY announces that since the destruction of the Rialto Building in San Francisco its business which was conducted there is being carried on in the Bacon Block, Oakland, Cal.

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How to Save Money on Poles

Within the past ten years more poles have been used than ever before. The demand is constantly increasing and within a short time will exceed the supply. Throughout the lumber districts of this country vast areas of denuded forest bear testimony to the rapid decrease of the available timber. So grave are the present conditions that the National Government, as well as many of the affected states, are considering prohibitive measures for the protection of the remaining forest areas.

From these facts it is not difficult to foresee that the cost of poles will rapidly increase and the problem of preservation, therefore, becomes one of immediate and serious consideration.

European countries were confronted with similar conditions more than thirty years ago. Investigations and experiments were conducted by a German chemist to discover a preparation which would prevent timber from rotting and yet not be expensive. The result of his labors was a product known as AVENARIUS CARBOLINEUM, which has received universal recognition as being THE BEST AND MOST PRACTICAL AND ECONOMICAL WOOD PRESERVATIVE ever placed on the market. It prevents DECAY of any sort and actually STRENGTHENS ANY WOOD to which it is applied.

It SINKS DEEPLY below the surface, expels and repels moisture, while its high contents of specific properties against putrefaction coagulate the albuminous parts of wood and prevent them to produce and continue decay. Owing to its high boiling point it does not increase the inflammability of the material treated. It DOES NOT DETERIORATE OR EVAPORATE. Its easy application (by brush or dipping) and LOW COST, added to the REMARKABLE PRESERVING QUALITIES, make AVENARIUS CARBOLINEUM an ABSOLUTE NECESSITY to all telephone companies which desire to practice economy.

Write for booklet showing dozens of testimonials from enthusiastic users.

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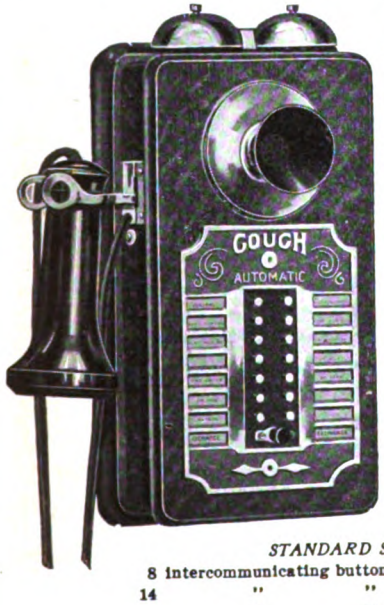
A Valuable Bi-Product



Where You Can Install
The Couch Automatic Interior System: in factories, offices, hotels, mines.

Why You Should Install It:
Because each instrument earns a yearly rental plus charges for exchange connections.

Why It Is Superior to a Branch Exchange:
Because it saves time, requires no special operator at one point and is always ready for service.

When You Should Install It:
Now, because every day there is some subscriber who wishes he had it and you are losing money if you don't get it to him.

Write for booklet.

Trunk Button — *Send for Catalogues*

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

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100,000—1¼ x 8 selected
25,000—1¼ x 8 commercial
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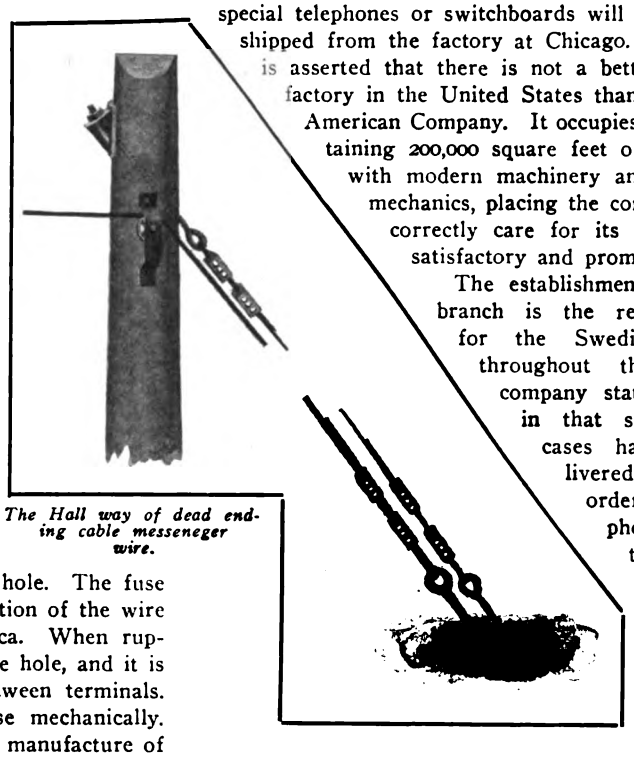
IN THE MANUFACTURING FIELD

MOUNTAIN STATE EQUIPMENT.

THE Mountain State Electrical Company, Wheeling, West Va., is calling attention to some of its specialties which are designed for high grade work and the reduction of maintenance expenses. One of the devices for which the company claims particular advantages is its apparatus used in connection with a special method of dead-ending cable messenger wires, designed by Frank B. Hall, president of the company. This method is illustrated by Fig. 1 upon this page. The messenger wires are carried from anchor to anchor by turning them down over cast metal sheave wheels bolted into the wrought iron frame with a 5/8 machine bolt through the pole. The eyebolt pulls against a cast angle washer, and the guy takes up the back strain caused by the angle in the messenger wire.



The Hall way of dead ending cable messeneger wire.

Mica fuses of a new type are also said to be giving very good satisfaction. Amongst the numerous companies which have used them are the Louisville Home Telephone Company, Louisville, Ky., and the Richmond Telephone Company, Richmond, Ind., which have both expressed their satisfaction. These fuses are made in a novel manner, which is designed to secure improved operating and maintenance features. They contain three pieces of mica, the middle piece being perforated with a single hole. The fuse wire is threaded through the hole, making a portion of the wire run along each side of the middle piece of mica. When ruptured the vapor caused by fusion is cut off at the hole, and it is made impossible for the arc to pass across between terminals. The outside pieces of mica strengthen the fuse mechanically. The company states that no solder is used in the manufacture of this apparatus, the fuse wire being placed in a cut made in the copper strip, and copper and fuse pressed into a solid piece. Those who wish to economize can renew the fuse after the break.

The company is also manufacturing a line of marlin cable hangers, made of a superior grade of stock, to represent the highest standard for this class of material. This, in fact, is the rule which the company has determined to apply to all of its appliances, as it is fully convinced from its wide experience that the best material is the most economical. Numerous other devices which are of much practical value to telephone managers have been originated by this company, and it will be pleased to send information concerning any of its products to interested inquirers.

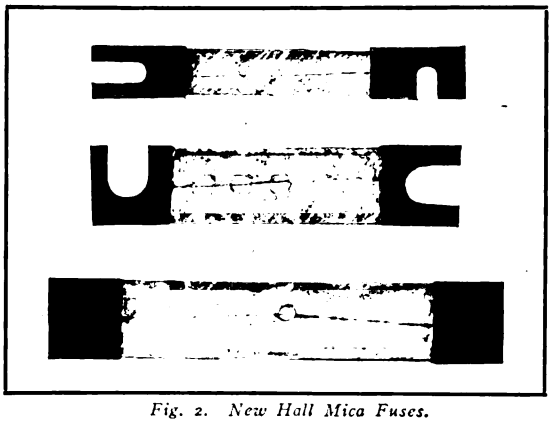


Fig. 2. New Hall Mica Fuses.

NEW PURCHASING OPPORTUNITY FOR KANSAS INDEPENDENTS.

THE Swedish-American Telephone Company has established a branch warehouse and salesroom at 115 West Sixth street, Kansas City, Mo., at which point it will carry a large stock of standard Swedish-American instruments, packed and ready for shipment on the same day that orders are received. It will also carry a stock of telephone and line supplies, such as cross arms, brackets, pins, wire, insulators, etc., etc. The many customers of the Swedish-American Company in the southwest will appreciate the establishment of the Kansas City branch, because of the convenience in obtaining goods quickly.

A telephone has been installed and orders may be placed by calling up over long distance lines Home Tel. No. 7176 Main. It is to be understood, of course, that only standard instruments and parts will be shipped from Kansas City, and any orders for special telephones or switchboards will necessarily have to be shipped from the factory at Chicago. In this connection it is asserted that there is not a better equipped telephone factory in the United States than that of the Swedish-American Company. It occupies a large structure containing 200,000 square feet of floor space equipped with modern machinery and operated by skilled mechanics, placing the company in a position to correctly care for its customers wants in a satisfactory and prompt manner.

The establishment of the Kansas City branch is the result of the demand for the Swedish-American product throughout the southwest. The company states that Independents in that section can in many cases have their goods delivered the next day after ordering, and all telephone men know that there are times when telephones are needed quickly to accomplish certain results. The affairs of the Kansas City branch will be in charge of W. O. Rhode, a practical and experienced telephone man, who with his able assistants will take pains to see that every order received will have careful, thorough and immediate attention.

THE BROWNLEE LUMBER COMPANY, of Chattanooga, Tenn., which manufactures telephone and telegraph cross arms, has made all arrangements for removing its plant to Shubuta, Miss., where it will be consolidated with another branch in order that the entire plant may be near a large quantity of timber owned by the company.

"PERFECT TELEPHONES" is the title of an attractive booklet recently issued by the telephone department of the Wesco Supply Company, of St. Louis. The illustrations, arrangement and text of the book are in keeping with the excellence of the telephones which this company is offering the trade. A copy will be sent to any telephone buyer for the asking.

G. M. GEST, subway contractor, has obtained control of the Rundle Patented Graphic Chart System for recording underground and overhead cable data. This system of charts has been adopted by the largest conduit users in the United States. A descriptive article was published some time ago in one of the technical papers. Further data regarding this cable chart and its uses can be had in writing by any one of G. M. Gest's several offices.

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World's Best Battery

R·I BAT

Here's the trademark. It *means* a whole lot. On the

Rock Island New Patent Dry Cell

it's a warranty deed for more lasting worth than is loaded into *any other* dry battery. Every battery is *made by hand*. This mode of careful construction *insures* superiority. Competitive and exhaustive tests have proved that the Rock Island has 20 to 30 per cent. *greater efficiency* and

20 to 30 Per Cent. Longer Life Than Others

Our Standard No. 6 is the regular size most generally used for all purposes.

Our Standard No. 8 is 3½ by 8 inches and it is the battery that has won highest endorsement from leading Telephone Manufacturers and Telephone Companies. They find it just the sort of battery needed for their *best* work —*the* battery for reliably long service. Higher at first cost, it is *cheaper* in the long run.

Write Department D for prices.

ROCK ISLAND BATTERY CO.
Ninth and Sycamore Streets Cincinnati, O.

WHAT A CALCULAGRAPH DOES

It prints the time of day a toll message commences.

It mechanically records the elapsed time in minutes and quarter minutes.

It works without any mental effort on the part of the operator.

It prevents doubt and leaves no room for argument.

It improves the efficiency of the service.

It will save its cost in a short while by increasing the revenue from over time charges.

IT MAKES NO CLERICAL ERRORS.

It is accurate to the second.

Write for booklet.

The CALCULAGRAPH CO.
1437 Jewelers Building, NEW YORK, N. Y.

THE STANDARD "HEMINGRAY"

All With The

"Patent Drip Petticoats"

The Hemingray-Glass Co., Office, Covington, Ky. Factory, Muncie, Ind.

ESTABLISHED 1848

Insulated Electrical Wires and Cables

ROEBLING

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

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Agencies and Branches

NEW YORK **CHICAGO** **CLEVELAND**
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THE WEEK'S MESSAGES

FINANCIAL.

JUNCTION, ARK.—The Local Telephone Company has increased its capital stock to $25,000.

TOPEKA, KAS.—The Independent Telephone Company has increased its capital stock from $150,000 to $1,000,000.

RISING SUN, MD.—The Cecil Farmers' Telephone Company has increased its capital stock from $30,000 to $60,000.

WILLIAMSBURG, MASS.—The Williamsburg Independent Telephone Company is to increase its capital stock from $50,000 to $100,000.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company has declared its regular quarterly dividend of 2 per cent.

WARREN, N. H.—The Baker's River Telephone Company has increased its capital stock to $5,000.

CHESTER HILL, O.—The People's Telephone Company, of Chester Hill, has increased its capital stock from $15,000 to $20,000.

SANDUSKY, O.—The Sandusky Telephone Company has increased its capital stock from $75,000 to $200,000.

WILMOT, O.—The Valley Telephone Company has increased its capital stock from $1,000 to $5,000.

MARTIN, TENN.—The Weakley County Telephone Company has increased its capital stock from $11,800 to $18,300.

FRANCHISES.

NEZ PERCE, IDAHO.—The Nez Perce Co-operative Telephone Company has been granted a franchise at Council.

WESTVILLE, IND.—A franchise has been granted to E. S. Smith, E. T. Scott, D. W. Weed, Jacob Herrold and J. M. Kelly to construct a telephone system in Westville.

NEW ORLEANS, LA.—The Tulane Telephone & Telegraph Company is applying for a franchise at New Orleans. The officers of the company are C. W. Tinker, president; Charles Sutter, vice-president; Geo. Tinker, treasurer; all of St. Louis. Secretary J. L. Macon, New Orleans.

LEYDEN, MASS.—The Heath Telephone Company of Heath, Mass., has been granted a telephone franchise at Leyden.

SPRINGFIELD, MO.—The Springfield Home Telephone Company, recently incorporated, has applied for a franchise at Springfield.

YSLETA, TEXAS.—J. A. Smith, J. J. Smith, I. G. Gaal and Geo. Huffman have been granted a franchise to build a telephone system from El Paso to Ysleta.

CAMAS, WASH.—The Fern Prairie and Camas Telephone Company of Camas has been granted a franchise.

COMBINATIONS.

SAN DIEGO, CAL.—The Home Telephone Company has acquired the Clarke telephone line running from Lakeside to the Stonewall mine at Cuyamaca. The line will be entirely rebuilt at a cost of about $5,000.

MACOMB, ILL.—The Illinois Western Telephone Company has acquired the telephone system at Camp Point, also the one at Golden. The company is to build a new metallic trunk line from Macomb to Quincy.

PONTOOSUC, IA.—Dr. Bortz, of Nauvoo, has purchased Rand & Starkweather's telephone lines and exchange at Pontoosuc. He will install a new switchboard and improve the lines generally.

SIBLEY, IA.—George Carew, of Sheldon, has purchased the telephone exchange in Sibley from the Western Electric Telephone Company. Mr. Carew expects to improve the system.

WALCOTT, IA.—The Davenport and Tipton Independent Telephone Company has transferred to the German Mutual Telephone Company of Clinton, Ia., its rights in the town of Walcott.

KANSAS CITY, KANS.—The Home Telephone Company of Kansas City has submitted a proposition for the purchase of the Humboldt, Moran, Savonburg, Elsmore and La Harpe telephone exchanges.

SHINNSTON, W. VA.—The Bridgeport Telephone Company, Shinn's Run Telephone Company, the Mudlick Telephone Company and the Bingamon Telephone Company are to be consolidated and a new charter applied for at Shinnston.

ELECTIONS.

HARTLAND, MINN.—The Hartland Telephone Company has elected the following officers: W. W. Byers, general manager; Andrew Jacobson, treasurer; C. A. Stensrud, secretary.

NELSON, NEB.—The Nuckolls County Telephone Company has elected the following directors: J. C. Chamberlain, J. C. Day, J. R. Parsons, I. A. Wehrman, W. A. Voigt and S. A. Lapp.

NANTICOKE, N. Y.—At the annual meeting of the Glen Aubrey and Whitney Points Telephone Company the following officers were elected: P. E. Sutpher, president; Chas. Slack, vice-president; William Borden, secretary; Duane Barnes, treasurer; B. D. Cady, George Vandeburg and Carley Smith, directors.

OWASCO, N. Y.—The West Lakeside Telephone Company, of Owasco, has elected the following officers: President, Clark W. Gravitt; vice-president, Geo. B. Cuddeback; secretary and treasurer, Smith Odell. Directors: Geo. Hoyt, Calvin Loyster, W. E. Hatch, John I. Fisher, E. C. Chamberlain and N. B. Ford.

NEW COMPANIES.

CAMPBELL, CAL.—The Farmers' Mutual Telephone Company has been organized. President and Manager C. J. Ringe; vice-president, F. M. Righter; secretary, A. C. Keesling; treasurer, J. M. Butts.

MILLSTADT, ILL.—The Millstadt Telephone Company, Millstadt, has been incorporated with a capital stock of $1,200. The incorporators are F. W. Krechner, S. C. Sautof, A. C. Kern.

OCOYA, ILL.—The Eppards Point Telephone Company has been incorporated with a capital stock of $25,000. The board of directors is: W. W. Osborn, W. W. Wagner, W. E. Fisk, W. B. McElhiney, H. M. Reed and F. Kipfer.

PECATONICA, ILL.—The Pecatonica Mutual Telephone Company has been incorporated with a capital stock of $520. The incorporators are Gilles Elliot, Fred Morrison and Martin Dotty.

PEKIN, ILL.—The Peoria, Pekin & Tremont Telephone Company has been incorporated with a capital stock of $2,500. The incorporators are A. J. Davis, Walter H. Ames and S. A. Hayward.

BUFFALO, IND.—An Independent Telephone Company is to be organized at Buffalo. Among those interested in the movement are U. M. Downey, Jay Davis, Everett Bible, John Sluyter and Marion Sluyter.

CUMBERLAND, IND.—The German Telephone Company, Cumberland, has been incorporated with a capital stock of $500. Directors are Christian Plonges, Christian Wiebke, Charles Kleiman, Aquilla Jeffers and Henry Hartman.

AUGUSTA, KAS.—The Rose Hill and Augusta Mutual Telephone Company has been incorporated with a capital stock of $2,000.

BOLTON, KAS.—The Central Bolton Telephone Company has been organized. J. A. Ramsey is president of the company, and Roy F. Greene, secretary and treasurer.

DEERHEAD, KAS.—The Ranchman's Telephone Company has been incorporated with a capital stock of $4,000.

MUNDEN, KAS.—The Farmers' and Citizens' Telephone Company of Munden, Kas., has been incorporated.

PARSONS, KAS.—The Prairie Telephone Company has been incorporated with a capital stock of $200,000. J. A. Plotner and Fred H. Brown are among the incorporators.

GRASS LAKE, MICH.—The Grass Lake and Sharon Telephone Company has been incorporated with a capital stock of $1,000. The directors are W. G. Alber, John Lemm and A. L. Holden.

REEMAN, MICH.—The Reeman Telephone Company has been incorporated with a capital stock of $150.

LONG LAKE, MINN.—The Hennepin Telephone Company has been incorporated with a capital stock of $25,000.

NELSON, MINN.—The Nelson Telephone Company has been incorporated with a capital stock of $10,000.

NIMROD, MINN.—The Nimrod Rural Telephone Company has been formed to build a line from Nimrod to Sebeka.

WHITEHALL, MONT.—The Montana Co-Operative Telephone Company has been organized at Whitehall. F. L. Grandy is president of the company, and John B. Wellcome, secretary.

BOYDSVILLE, MO.—The Boydsville, Englewood & Ginlet Telephone Company has been organized with the following officers: A. L. Barker, president; T. B. Jenkins, vice-president; C. W. Betz, secretary and treasurer; J. W. Goodwin and C. W. Betz, managers.

DILLER, NEB.—The farmers living in the vicinity of the Oaks school house, northwest of Diller, met and organized the Farmers' Co-Operative Telephone Company. The directors are Roy Diller, C. W. and F. L. Rohrabaugh, C. C. Blauser, J. A. Price and others.

EAGLE, NEB.—The Eagle Telephone Company has been incorporated with a capital stock of $3,000.

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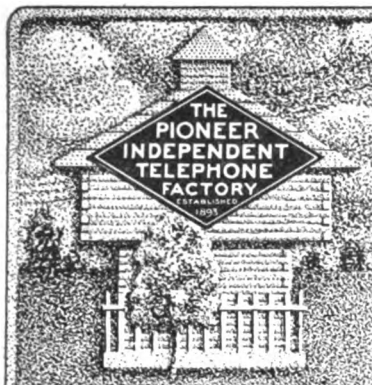

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GUARANTEED
SWITCHBOARDS
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TELEPHONES
BOTH MAGNETO AND CENTRAL ENERGY

Type P

They Speak For Themselves

All of our Products Manifest Their Own

QUALITY, EFFICIENCY, DURABILITY

We Guarantee Every One Of Them and Every Part

Type "P" Ringing and Listening Key is mechanically and electrically as near perfect as it is possible to make it. It has only four (4) wearing parts, and will last for years. When necessary to replace wearing parts, a screw driver and a pair of pliers are all that are needed. No disconnecting necessary.

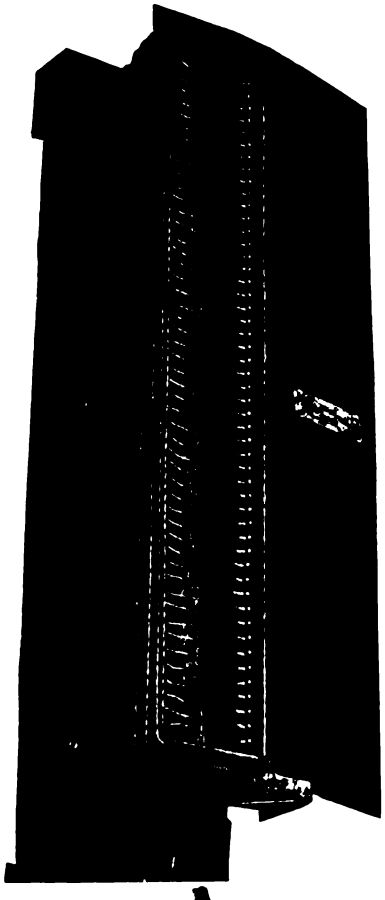
Frame is a solid piece with nickel-plated top and a lever with black or red rubber handle. Springs are all German silver of the right length and thickness to secure the best effects with pure hard rubber as an insulation. The key has a good action. Contact points are all pure platinum.

A postal will bring illustrations, samples and prices.

Western Telephone Manufacturing Co.

Pioneer Independent Telephone Factory

Established 1893 No. 58 West Jackson Blvd., Chicago



Cable Terminals by the Pound

The weight of our "Becker" Terminal is one-half that of any other, for we use $\frac{1}{8}$ inch pressed steel instead of cast iron. The saving in freight alone is quite an item, not to mention the ease with which the "Becker" can be put into place.

Pressed Steel "Becker" Terminals are water and air tight; furnished with self-soldering nozzle and fuses (plain if desired); have plenty of room for connections; have German silver fuse clips; have hard rubber insulation. Cable soldered to clip terminals; no loose contacts.

They last longer, look better, cause no trouble, cost less.

25 pair, wt. 20 lbs., price fused,	$12.50	plain,	$10.00
50 pair, wt. 30 lbs., price fused,	22.00	plain,	18.00
100 pair, wt. 50 lbs., price fused,	40.00	plain,	32.00

Covers $2.00, $2.50 and $3.50

CENTRAL TELEPHONE & ELECTRIC CO.

2133-35-37 LUCAS AVENUE ST. LOUIS, U. S. A.

Makers of HIGH GRADE TELEPHONE EQUIPMENT

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THE WEEK'S MESSAGES

VALPARAISO, NEB.—The Valparaiso Telephone Company has been incorporated with a capital stock of $25,000. The incorporators are A. C. Abbott and C. H. Wood.

BURLINGTON FLATS, N. Y.—The Burlington Flats Telephone Company has been organized.

PALERMO, N. Y.—The Palermo Telephone Company, organized by the citizens of Palermo, is about to be incorporated with a capital stock of $1,500. The company's line is to extend from Fulton to Vermillion. The directors are: G. D. Trimble, F. D. Stone, Glenn Trimble, F. A. Moore, E. A. Howard, G. W. Dennis, J. H. Mace, Ira Flint and F. A. McCullom.

STATESVILLE, N. C.—An Independent Telephone Company has been formed at Statesville with a capital of $10,000.

ALLIANCE, O.—The Sandy Valley Telephone and Electric Company of Alliance has been incorporated with a capital stock of $50,000. The company will operate in Stark, Tuscarawas and Carroll Counties. The incorporators are R. S. Kaylor, F. D. Miller, of Alliance; A. S. Hillhouse, W. M. Welker and Norton Purude, of Canton.

BIRMINGHAM, O.—The Riverside Telephone Company has been incorporated. C. S. Chisler is among the incorporators.

EAST TOWNSEND, O.—The Townsend Telephone Company, East Townsend, O., has been incorporated with a capital stock of $10,000. Incorporators are C. B. Canfield, C. L. Moore, Geo. W. Helling, A. D. Bargns and Geo. E. Stacy.

TAYLOR, PA.—An Independent Telephone Company has been formed at Taylor. John W. Wright, of Taylor, is one of the incorporators. The new company will form connections with the Citizens' Telephone Company, of New Castle.

ARCADIA, WIS.—The Tamarack Telephone Company has been organized at Arcadia, Trempealeau County, with a capital stock of $30,000. The incorporators are Calvin Gilbertson, Albert Syverson, Ole O. Olsen, Alexander Olsen and Thomas Thornson. The company will connect with the Winona Telephone Company and the La Crosse Telephone Company.

WEATHERFORD, TEXAS.—The Home Telephone Company of Weatherford will shortly be chartered with a capital of $50,000. The company has already been formed and taken over the Riddle Telephone Company. The company will spend $25,000 in improvements. J. A. Casier and J. A. Murray are among the organizers.

MISCELLANEOUS.

PORTLAND, ME.—The Northeastern Telephone Company is making a vigorous campaign for new subscribers. The company had a very good development before the canvass was started, but the new telephone directory will show an increase of over five hundred subscribers. It is proposed to keep up the work in Portland until a thousand subscribers have been added and then to take up the work at Lewiston, Auburn and other exchanges in Maine now owned by the Northeastern Telephone Company.

COUPEVILLE, WASH.—The Eclipse Telephone Company is soon to occupy a new office in the building being erected for the joint use of the telephone company and the Island County Record.

MONTREAL, QUEBEC, CANADA—The League of Quebec Municipalities has endorsed municipal ownership of telephones.

PERSONAL.

HOWARD S. BAKER has recently taken active charge of the management of the Sioux City (Ia.) Telephone Company, holding the offices of vice-president and general manager.

J. EPPS BROWN has been elected general manager of the Southern Bell Telephone and Telegraph Company.

COLONEL N. T. GENTRY, who has been vice-president and general manager of the Southern Bell Telephone and Telegraph Company will hereafter devote his time exclusively to executive duties as vice-president.

W. P. MARSILLIA has been appointed manager of its exchange at Fenton, Mich., by the Michigan State Telephone Company.

A. L. PIPER has been appointed special agent of the New York and Pennsylvania Telephone Company. His territory is Western New York and Northwestern Pennsylvania.

A. P. REYNOLDS has been appointed contract agent of the Johnstown (Pa.) Telephone Company.

CHARLES F. SPEED, of Texarkana, Ark., who has become so well known to the Independent telephone men of the southwest during his long connection with a prominent manufacturing house as representative and sales manager, has arranged to represent the Stromberg-Carlson Telephone Manufacturing Company in Arkansas, Louisiana and Texas.

H. H. WARREN has been appointed manager of the exchange of the Michigan State Telephone Company at Boyne City, Mich.

New Construction in the Field

SEWARD, ILL.—The Illinois Mutual Telephone Company, with headquarters at Seward, expects to make many extensions to its system.

CRISMAN, IND.—The Portage Home Telephone Company, of Crisman, which has recently increased its capital stock from $10,000 to $30,000, is to spend the additional capital in extending its lines.

ELKHART, IND.—The Home Telephone Company is to spend $7,000 in improving and extending its system.

MAJENICA, IND.—The Majenica Telephone Company is extending its lines south from Rock Creek Center and north from Brown's Corners.

MT. UNION, IA.—B. B. Lindley, D. Glass, Ed. Huston and J. A. Baxter, of Winfield, contemplate the installation of a telephone exchange at Mt. Union, establishing connections between Mt. Union, Winfield and Yarmouth.

RINGSTED, IA.—The Farmers' Mutual Telephone Company is building a rural line at Ringsted.

SLOAN, IA.—The Lossing Telephone Company expects to construct two new lines.

CLEMENTS, KAS.—The Clements & Cedar Point Telephone Company is overhauling its system and rebuilding its lines.

TESCOTT, KAS.—The Tescott Telephone Company is to build a line to Marydel.

TOPEKA, KAS.—The Independent Telephone Company is to spend $400,000 in the city of Topeka in improving its system.

CHAMBERS, KY.—The Chambers Telephone Company is to build a new line.

ARCO, MINN.—The Arco Telephone Company is to build several new lines.

HARTLAND, MINN.—The Hartland Telephone Company is to build a new line.

LERDAL, MINN.—The Lerdal Telephone Company is to make many changes in its system. The company will also build a line to Geneva.

MORRILL, MINN.—The Morrill Telephone Company is going to extend its lines in various directions.

CHAPMAN, NEB.—The Independent Telephone Company is extending its lines in Chapman.

YERINGTON, NEV.—The Independent Telephone Company is to extend its lines to Smith Valley, Gardnerville, Aurora and other points.

ASHLAND, N. H.—The Citizens' Telephone Company is to extend its lines to Plymouth.

SUPERIOR, N. M.—The Superior Telephone Company is to build a line from Superior to Florence.

CINCINNATUS, N. Y.—The Inter-Ocean Telephone Company of Buffalo is to build a line to Cincinnatus.

ONEONTA, N. Y.—The Home Telephone Company is to construct a line from Oneonta to Kingston, also to Andes.

DICKINSON, N. D.—Messrs. Hughes and Deiter, of Dickinson, N. D., are to build a telephone line to Glendive, Mont.

McCONNELSVILLE, O.—The Riverside Telephone Company is to spend $4,000 in improving its system.

SANDUSKY, O.—The Sandusky Telephone Company is to spend about $100,000 in extending and enlarging its system.

FRIEDENSBURG, PA.—The Friedensburg Rural Telephone Company is to extend its lines.

MONTROSE, PA.—The Montrose Telephone Company is to extend its lines in Montrose.

ROCK HILL, S. C.—The Rock Hill Telephone Company is to establish a new exchange at Rock Hill.

CARTHAGE, S. D.—Gunder Serns and D. D. Baldwin are to build a telephone line from Carthage to Howard.

FT. PIERRE, S. D.—The Great Western Telephone Company is to build an extension from Ft. Pierre to Rapid City.

HERMOSA, S. D.—The Hermosa Telephone Company is to build a line to Custer.

MARTIN, TENN.—The Weakley County Telephone Company is to spend $6,500 in putting in a new system.

ITASCA, TEX.—The Citizens' Telephone Company is building a line from Itaska to Bois d'Arc.

GUM SPRING, VA.—The Silvicola Farmers' Telephone Company is extending its lines in the direction of Mill Point.

TRUITT, VA.—The Camp Manufacturing Company is building a telephone line from Dewitt to Franklin.

TACOMA, WASH.—The Home Telephone Company will erect a new central building at Tacoma at a cost of $50,000.

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OUR MOTTO—QUALITY AND PROMPT SHIPMENTS.

KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

We have recently published a little book giving some very valuable information about Cedar Poles. It contains Specifications, Inspection Comments, Shipping Data, Etc. "Yours for the asking."

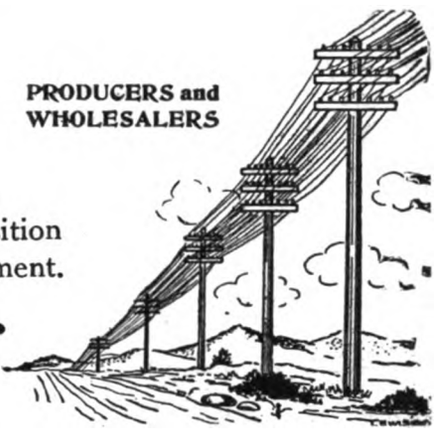
KELLOGG SWITCHBOARD & SUPPLY COMPANY - - - CHICAGO, ILL.

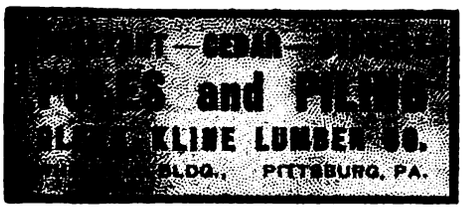
PITTSBURG & LAKE SUPERIOR IRON CO.,
ESCANABA, MICHIGAN.

PRODUCERS and WHOLESALERS

WE always carry a large stock of all sizes of White Cedar Poles, and having yards on all principal railroads in Northern Michigan and Minnesota, are in position to make immediate shipment.

"From the Stump to the Line."





CHESTNUT POLES

J. I. M. WILSON COMPANY

Wholesale Producers

Bessemer Building PITTSBURG, PA.

POLES

30 and 25 feet lengths for rural telephone lines a specialty.

PORTER CEDAR CO., Saginaw, Mich.

WHITE CEDAR POLES

Buy from the Producers and Save Jobbers' Profits.

PENDLETON & GILKEY - Minneapolis, Minn.

We Make a Specialty of Telephone Poles.

POLES

Large Stock 16 to 25 ft. 9 to 6 in. Tops For Rural Lines

POLES

YARDS: Menominee, Mich. Escanaba, " Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.

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WHITE CEDAR POLES

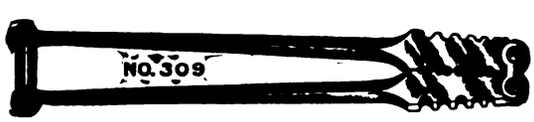
Longest Lasting Best Grade

40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st

25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

Yards { Omer, Bay City and Boyne Falls

W. C. Sterling & Son Co., Monroe, Mich.



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Send a two-cent stamp for 48-page catalogue.

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ALWAYS GIVE IT
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HARRISON, N. J.
EDISON
TELEPHONE LAMPS 869

Experts in Underground Conduit Subway Construction
THE BUTTERFIELD CONSTRUCTION CO.,
326 Reaper Block, Chicago.

CARD INDEX SYSTEM
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Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
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THE TELEPHONE PRINTING CO.
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Complete Telephone Exchanges Built and Material Furnished.
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"HIGH-DUTY"
Don't Buckle or Blister
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STANDARD PORTABLE DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.
Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.
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Plans and Specifications for Complete Telephone Equipments. Existing Plants Remodelled.
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TELEPHONE & TELEGRAPH WIRE
HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
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WE GALVANIZE BY THE HOT PROCESS
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TRADE MARK
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1889—Paris Exposition Medal for Rubber Insulation 1893—World's Fair Medal for Rubber Insulation
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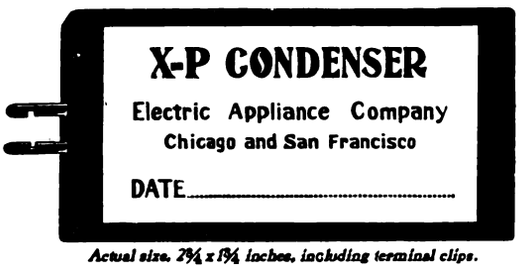

Actual size. 2¾ x 1¾ inches, including terminal clips.

"X-P CONDENSERS"

WILL HELP INCREASE YOUR SUBSCRIBERS

By installing them in your bridging telephones you improve the service. Better send us a trial order.

Electric Appliance Company, Telephone Manufacturers

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Perfect, Permanent Contact between Conducting Frame and Active Mass

is a notable feature of the Gould Plate. For excellent retention of initial capacity, for high watt-efficiency, for long "life" and for the greatest return on the money invested, the Gould Storage Battery stands pre-eminent.

It will pay you to investigate the many good points of the Gould cell. Send for the Gould Bulletins.

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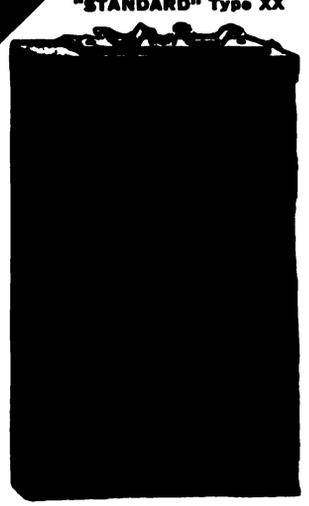
"STANDARD" Type XX



Are you figuring on improving the service of your telephone system, or are you going to go on in the same old way, with the same old annoyances, troubles and kicks bound to recur.

Instead of a faulty and poor service line, why not anticipate the complaints which are sure to come, and equip your line with

Andrae Condensers

By their use such things as "listening in" and the breaking of the circuit by leaving receivers off their hooks are made impossible.

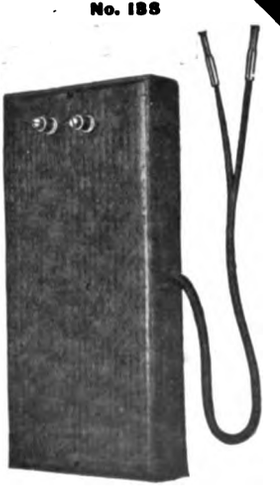
They come in three styles—two illustrated herewith—and each style is *fully guaranteed.*

We have a standing offer to *equip an entire line on trial* and will pay *return charges* if you say they're not as represented.

Andrae Telephones Never Disappoint.

Our large catalog No. 11 will be sent you upon request. It's free for a postal. Write for it *to-day.*

No. 188



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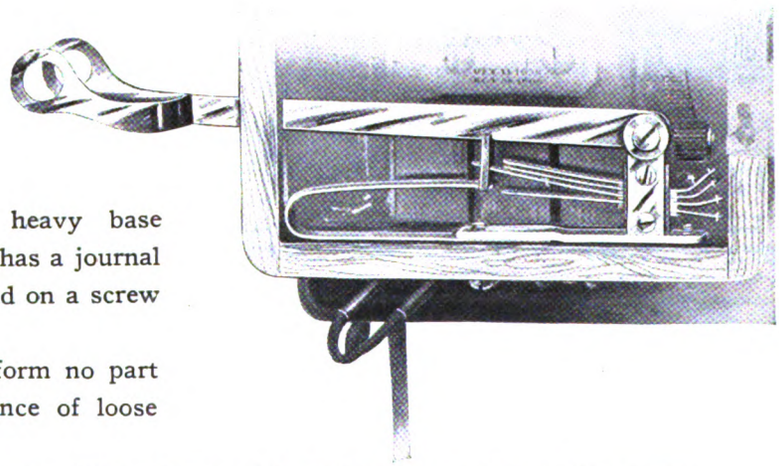

NORTH'S horizontal lever adjustable tension hook-switch is strong, simple, reliable—insuring perfect action—positive contacts.

Entirely self-contained—a heavy base made in one piece. The lever has a journal bearing hinge—does not depend on a screw to support it.

The lever, base and hinge form no part of the circuit—avoids all chance of loose contacts or accidental shocks.

The controlling spring is German Silver, long and flexible, and capable of adjustment.

The contact springs are German Silver—provided with pure platinum contact points (not platenoid or other alloy). They are made straight—to give maximum resiliency.

They are mounted in a slotted pure hard rubber block (not fibre) and held in place by a brass clamp and two long machine screws—no chance to work loose.

All contacts and terminals in plain view.

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THE
NORTH ELECTRIC CO.
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100% GOOD

FIRST

The induction coil mounted in the base.

SECOND

The great strength of the standard, owing to the use of hard drawn brass throughout.

No. 85 Local Battery Desk Telephone

THIRD

The ease with which spring contacts and connections may be inspected.

FOURTH

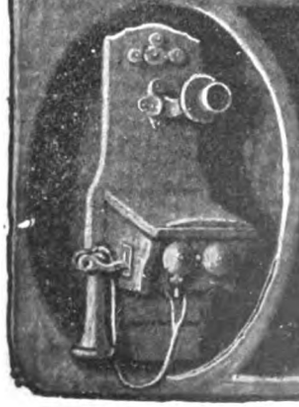
All connections being soldered and terminating in binding posts to which cords connect.

FIFTH

The perfect proportions and neatness of design presenting a most pleasing appearance **makes this desk telephone not only the most efficient but also the most economical for general use.**

It Would Be To Your Advantage To Know More About It
LET US SEND YOU ONE

OUR LINE OF COMMON BATTERY EQUIPMENT IS COMPLETE



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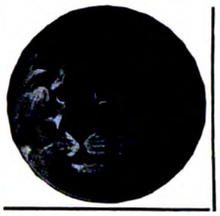
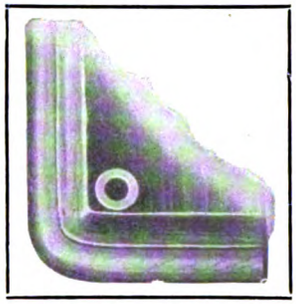


Little Things That Count



The cabinets of all MONARCH TELEPHONES are equipped with bushings placed in the holes at the corners. This little feature adds a finished appearance to the instrument, and protects the woodwork which otherwise would be marred by the mounting screws.

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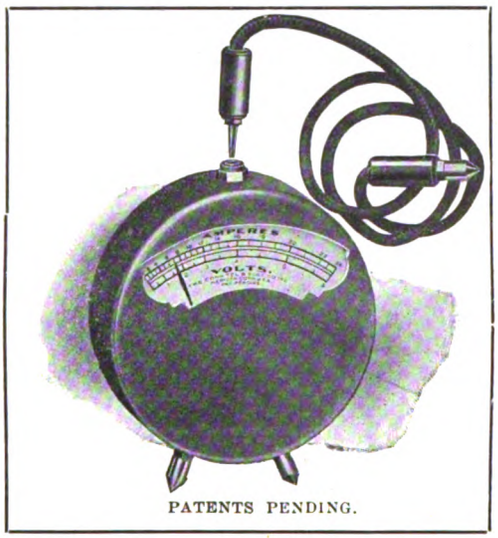
VOLT AMMETER, $6.00.
AMMETER ONLY, $4.00.



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SPECIAL DISCOUNT TO THE EXCHANGE.

"CONNECTICUT" VOLT AMMETER

For testing batteries in connection with telephones, electrical instruments, automobiles, gasoline engines, etc.

ACCURATE, DURABLE, GUARANTEED!

NOTE.—If even one cell is worn out the efficiency of the others are lost. You can't locate this one without the volt ammeter.

WILL SAVE ITS COST IN A SHORT TIME.

Conn. Telephone & Electric Co.

MERIDEN, CONN., U. S. A.

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The

PREMIER "BB"

Steel Wire Switchboard Cord

IS GUARANTEED TO GIVE SATISFACTION

A Trial Will Convince You. Write for our Trial Offer. Secure our Prices

Cut Shows Scientific Construction Which Overcomes Wear and Rough Usage

PATENTED MAY 9, 1905. OTHER PATENTS PENDING

PREMIER ELECTRIC COMPANY

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Manufacturers of

Cords, Wires and Cables for Telephone Purposes

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MAGNETO TELEPHONES

for rural lines is our specialty. We have consistently developed a line of instruments especially for this class of service. The generators are extra powerful and the ringers are accurately wound so that a maximum number of telephones can be placed on a line and each will be able to signal the others clearly. The mechanism is substantial and well constructed to withstand hard usage.

Our prices are low. In fact, much lower than other reputable manufacturers ask for the same quality of apparatus. Write for our catalogue and learn how we are able to make the above statement and live up to it.

FARR TELEPHONE & CONSTRUCTION SUPPLY CO.

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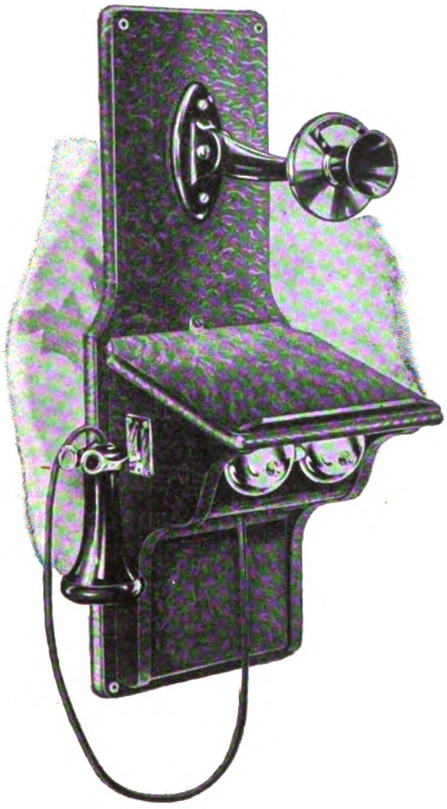
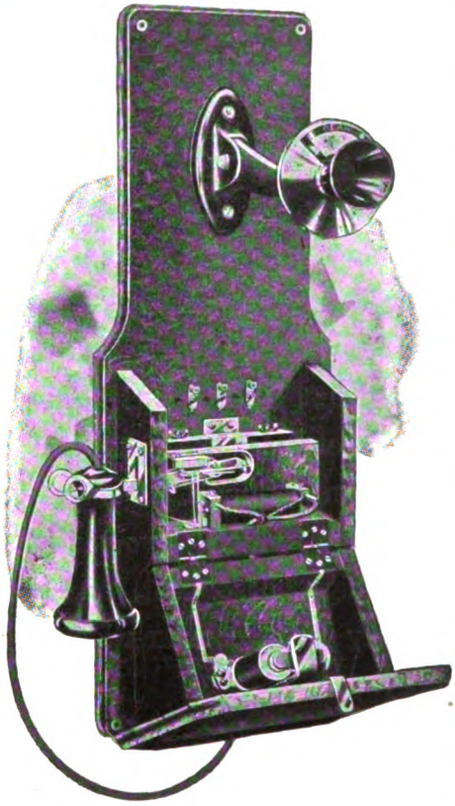
DEAN TELEPHONE APPARATUS



Common Battery Wall Telephones



The accompanying illustrations show one style of our common battery telephones which is fitted with the most efficient and simple circuit ever devised. It is direct acting, thereby avoids all losses inherent in other makes of circuits, eliminating losses being the most logical way of increasing efficiency. This circuit requires only one contact in the hook switch and only two connecting wires to the coil. The condenser does not enter into the talking circuit, therefore has only one function to perform—that of keeping the direct current from leaking through the ringer. The closed cabinet covers all working parts as well as all circuit connections so that there is no chance for trouble or for electrical shocks while the telephone is in use.

The shelf is made to unlock and allows the front part of the telephone to swing down on hinges, thereby fully exposing all of the working apparatus for inspection.

These telephones, as well as all the Dean wall type telephones, have our removable lever hook-switch.

We tell more about these telephones and show the circuits in our folder No. 3A, which will be gladly mailed to you on request.

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THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG

FREQUENCY POLE CHANGER

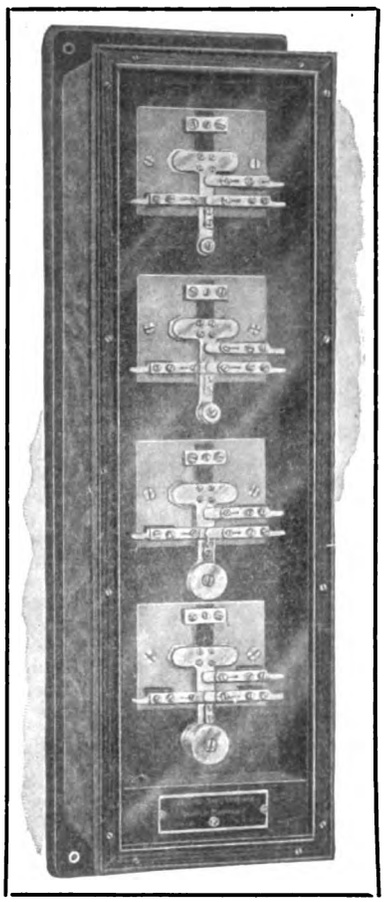
Utmost SIMPLICITY of Operation

THE EFFICIENCY

and beauty of the Selective Harmonic Ringing System of the Kellogg Company has been fully recognized by the entire Independent field, but the difficulty, heretofore, has been that the system required a generating device which involved a rather high first cost, and a relatively large consumption of energy.

The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



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2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. Dry cells can be used for the ringing current.
5. They can be furnished to work successfully under any load.
6. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
7. Operates successfully within the limits of 17 to 28 volts.
8. Noiseless in operation.
9. Only three contacts on each vibrator.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

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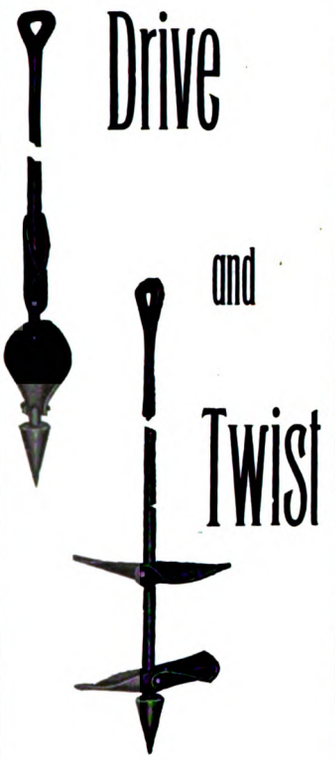

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Specially Designed for StonyGround

The D. & T. Anchor can be driven into the ground where a hole would have to be dug for any other type

Plainly the best anchor ever devised. Combining strength, holding power and ease of installation

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We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

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Cash Register and Pay Station

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

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It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE

United States Coin Register Co.

TOLEDO, OHIO

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requires the use of standard line hardware.

The Norton specialties conform with the most up to date ideas of design and are Standard.

It will cost you nothing to secure a copy of our catalogue and it will be worth a whole lot to you to know just what is considered the best in this particular line.

Patent Combination Messenger Hanger

If you are putting up cable, our **Patent Combination** Messenger Hanger is just the thing. Made from solid forged steel in three sizes for light, medium or heavy work, it is the best on the market. Always in stock either galvanized or japanned.

NORTON TOOL CO., West Park, Ohio

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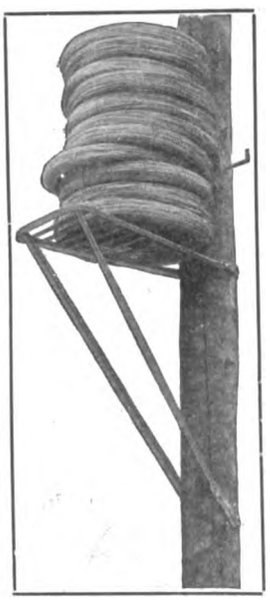
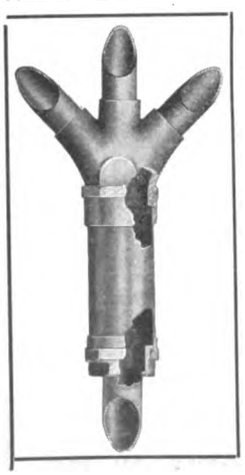
SECURITY POLE-SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.
Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton.
You will be pleased on investigation.



Novelty Potheads and Sleeves



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DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON, D. C.

April 18, 1906.

FRANK B. COOK, 240 West Lake street, Chicago, Ill.

Dear Sir:—Replying to your favor of the 8th inst. An examination of the U. S. Patent Office records show that you are the owner of the entire right, title and interest in each and every one of the following 34 patents.

There is no record of your having assigned any of these patents, nor is there any record of an injunction or any other court proceedings which affects your absolute right and title to same.

Very respectfully,

Jos. T. Allen

	Pat. No.	Date of Issue	Title	No. of Claims	Pat. will Expire
1	817,160	Apr. 10, 1906	Heat Coil (Self-Soldering Heat Coil.)	30	1923
2	816,847	Apr. 3, 1906	Iron Frame Distributing Board (Type L Distributing Frame.)	18	1923
3	815,406	Mar. 20, 1906	Auto. Electrical Self-Soldering Reset (No. 10 Protector.)	40	1923
4	815,006	Mar. 13, 1906	Thermal Protector and Alarm (Cook Type No. 4 Protector.)	18	1923
5	812,980	Feb. 20, 1906	Self-Soldering Heat Cartridge and Protective Apparatus (Cook Type Kaisling Protector.)	17	1923
6	812,184	Feb. 13, 1906	Thermal Protector and Alarm (Sterling Type No. 4 Protector.)	14	1923
7	810,914	Jan. 30, 1906	Protective Apparatus (No. 444 Protector.)	21	1923
8	803,881	Nov. 7, 1905	Self-Soldering Protector.	12	1922
9	802,939	Oct. 24, 1905	Ground Plate for Electric Protective Apparatus (Mounting Plate for Protectors.)	8	1922
10	802,736	Oct. 24, 1905	Electric Fuse (Type Q Fuse and Mounts.)	10	1922
11	802,684	Oct. 24, 1905	Heat Coil (No. 4 Heat Coil.)	1	1922
12	802,497	Oct. 24, 1905	Ground Strip for Protective Apparatus (Ground Strip for Protector Mounting Plate.)	13	1922
13	796,297	Aug. 1, 1905	Auto. Restoring Thermal Protector	7	1922
14	795,197	July 18, 1905	Self-Soldering Protective Apparatus (No. 8 Protector.)	16	1922
15	793,802	July 4, 1905	Electric Protective Apparatus (No. 8 Protector, Testing.)	42	1922
16	792,315	June 13, 1905	Self-Soldering Heat Coil (No. 8 Heat Coil.)	6	1922
17	788,130	Apr. 25, 1905	Cable Head and Pole House (Type S Cable Terminals.)	17	1922
18	786,005	Mar. 28, 1905	Elec. Prot'or Apparatus. (No. 44 Protector and Heat Coil.)	16	1922
19	785,798	Mar. 28, 1905	Self-Sold'ing Heat Coil.	37	1922
20	785,797	Mar. 28, 1905	Thermal Cut-Out for Electrical Circuits (Self-Soldering Protector.)	21	1922
21	785,407	Mar. 21, 1905	Self-Sold'ing Heat Coil. (Cook's Rolfe Type Protector.)	12	1922
22	783,995	Feb. 28, 1905	Test Plug for Protective Apparatus. (Broad Test Plug Patent.)	37	1922
23	776,218	Nov. 29, 1904	Self-Sold'ing Heat Coil. (Nos. 8 and 444 Heat Coils.)	20	1921
24	774,160	Nov. 8, 1904	Self-Soldering Protector.	18	1921
25	774,159	Nov. 8, 1904	Cross Arm Brace.	5	1921
26	774,158	Nov. 8, 1904	Protective Device for Electrical Circuits. (Type B-4 Substation Protector.)	10	1921
27	767,437	Aug. 16, 1904	Self-Sold'ing Fuse Post. (Self-Soldering Protector.)	3	1921
28	752,655	Feb. 23, 1904	Cross Arm Brace.	14	1921
29	740,744	Oct. 6, 1903	Polarized Electric Bell.	4	1920
30	711,921	Oct. 21, 1902	Fuse (Types A and D Tubular Line Fuses.)	13	1919
31	699,660	May 13, 1902	Polarized Electromagnetic Apparatus	5	1919
32	658,976	Oct. 2, 1900	Lightning Arrester.	3	1917
33	639,528	Dec. 19, 1899	Telephone Transfer Board	9	1916
34	451,933	May 12, 1891	Coupling for Elec. Wires (Self-Welding Wire Joint.)	3	1908

Explanation in parenthesis ( ) not in original letter.

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"NOTICE"

We have established a branch warehouse and salesroom at 115 West 6th Street, Kansas City, Mo., at which point we will carry in stock a large number of standard Swedish-American Instruments. This branch has been established to care for our many patrons in the Southwest.

ON AND AFTER MAY 1st

orders for Standard Instruments will be shipped same day order is received. Exchange managers or any one interested in Independent Telephony visiting Kansas City are invited to call at above number and inspect our apparatus. If you are looking for quality you will not be disappointed.

Swedish-American Telephone Co.

BRANCH, 115 WEST 6th STREET, KANSAS CITY, MO.
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Chicago, Ill.

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with that TELEPHONE INVESTMENT of yours?

Why doesn't it pay you as well as the best of your investments?

Is the reason bad management or bad equipment? More likely the latter.

Probably the company is trying to do a 20th Century business with 19th Century apparatus.

If that's the case, it is spending more and earning less than it might if it had our Automatic Telephone equipment.

This is the only really modern telephone system. It produces the ideal telephone service—quick, sure and secret—at half the operating expense of a manual equipment, and this service commands better rates.

It costs a fixed price per hundred lines to enlarge the automatic exchange, instead of an increased price per each hundred lines, as in the manual equipment.

The automatic exchange is never outgrown; it never has to be "scrapped" and replaced by a complete new one, as with the manual. You just add to it as you do to a sectional book-case.

All these points bear upon the stability and value of your telephone securities. They mean dividends to you.

Over ninety per cent. of all the large orders placed during the past few years, either for new installations or replacements, have been for our automatic system, and all the companies adopting it have, from the increased earnings, been able to pay the interest on their bonds and a good dividend on their stock.

Our Automatic System has been adopted in the following cities:

Aberdeen, S. D.	Clayton, Mo.	Hazleton, Pa.	New Bedford, Mass.	Sioux City, Ia.
Akron, Ohio.	Cleburne, Texas.	Hopkinsville, Ky.	Oakland, Cal.	South Bend, Ind.
Albuquerque, N. M.	Columbus, Ga.	Jonesboro, Ark.	Ocean Park, Cal.	St. Marys, Ohio.
Allentown, Pa.	Columbus, Ohio.	Lake Benton, Minn.	Pentwater, Mich.	Tacoma, Wash.
Auburn, Maine.	Dayton, Ohio.	Lewiston, Me.	Perry, N. Y.	Toronto Junction, Canada.
Auburn, N. Y.	El Paso, Texas.	Lincoln, Neb.	Portland, Me.	Traverse City, Mich.
Battle Creek, Mich.	Fall River, Mass.	Los Angeles, Cal.	Portland, Ore.	Van Wert, Ohio.
Bellingham, Wash.	Ferguson, Mo.	Manchester, Ia.	Princeton, N. J.	Watch Hill, R. I.
Berlin, Germany.	Florenceville, N. B., Can.	Marianao, Cuba.	Riverside, Cal.	Wausau, Wis.
Buxton, Iowa.	Grand Rapids, Mich.	Medford, Wis.	San Diego, Cal.	Westerly, R. I.
Cadillac, Mich.	Hastings, Neb.	Miamisburg, Ohio.	Santa Monica, Cal.	Wilmington, Del.
Chicago, Ill.	Havana, Cuba.	Mount Olive, Ill.	Sawtelle, Cal.	Yuma, Arizona.

AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets, CHICAGO, U. S. A.

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Central Energy Telephones

Stromberg-Carlson

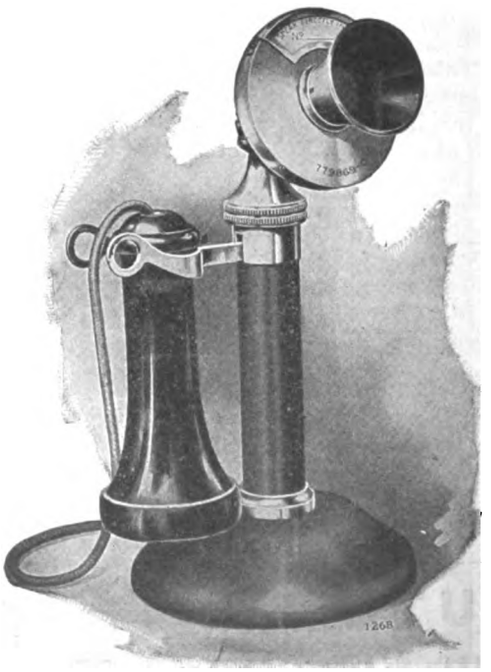
TELEPHONE MANUFACTURING CO.
ROCHESTER, NEW YORK

IF you use or contemplate using Central Energy Telephones it will pay you to get a copy of this new bulletin. There is sufficient evidence in it to prove that the telephones illustrated therein are without exception the most modern and nearest to perfection of any ever placed on the market. This statement is not based on the fact that our cabinets are better finished, that we have a better transmitter or a removable hookswitch, but the telephone taken as a whole.

There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?



Stromberg-Carlson Telephone Mfg. Co.

General Offices
Rochester, N. Y.

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WE MAKE CABLE

"A Message to Garcia"

created a sensation in the literary world when it appeared. We have a message to deliver that will create an even greater stir in the telephone field. Here it is:

The day of open wire construction for local service is past. Increased maintenance charges and the demands of subscribers for better service have sounded its death knell. Aerial and underground cable distribution are the only methods of construction which have stood the test of time. You must adopt them to satisfy your patrons and stockholders.

Read what men who know have to say upon this subject and profit by their experience.

MARTIN VAN BUREN, Manager of the plant of the Amsterdam Telephone Co., Amsterdam, N.Y., and a man who has been associated with the business since its infancy, writes as follows:

AMSTERDAM, N. Y., March 29, 1906.

Stromberg-Carlson Telephone Mfg. Company, Rochester, N. Y.

Gentlemen: My experience for the past twenty-five years in the telephone field has convinced me that the open line for heavy leads has seen its day. To give first-class service, have the rates within reach of every man who earns a moderate salary and still make the plant a paying investment which will encourage men with means to invest in the telephone field, it is necessary to have cable construction throughout. We are operating an all cable plant with *ten hundred and sixty lines* and have had but *two cases of line trouble since December* 1, 1905. One was unavoidable and the other we cannot account for, and that alone speaks for itself. Two years ago, we had an open line plant with 300 circuits. On leads where we had fifty to seventy-five pairs of open wires, after a heavy wind storm, it would take a trouble man from one to two days to remove all cases of trouble. When a comparison is made between the conditions as they then existed with only 325 subscribers working and the present all cable plant, which does not cost thirty per cent. as much to maintain clear of all cases of cable, line and instrument trouble, I am fully convinced that cable construction is the only salvation for the telephone field. It reduces maintenance expenses to the lowest figure, gives the subscribers the best possible service at a very low rate and still makes the telephone business a profitable investment.

Very truly yours, MARTIN VAN BUREN.

Martin Van Buren

Would you want a more convincing statement than that to show you which way the wind blows? We think not.

As you will need cable, and to get any other than the best is equivalent to jumping from the frying pan into the fire, you will be interested in our prices.

We have a cable book which will give you some pointers about our methods of manufacture and incidentally prove conclusively that Stromberg-Carlson Cable is the cable for you.

WRITE FOR BOOKLET 79-B

Note. You have now read the testimony of men who know. Why wait for further proof and put off the inevitable? Get busy and write to-day

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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applied to poles bought now will double their life and increase their strength, thereby effecting a large saving in future re-construction.

It is used throughout the world, and is specified in all government contracts where timber is to be used. It prevents dry and wet rot, and is absolutely the only preservative which protects at the wind and water line. Unlike paint, it readily penetrates to the heart of the wood, and its antiseptic qualities neutralize all gum-producing organisms. Write for testimonials and further information.

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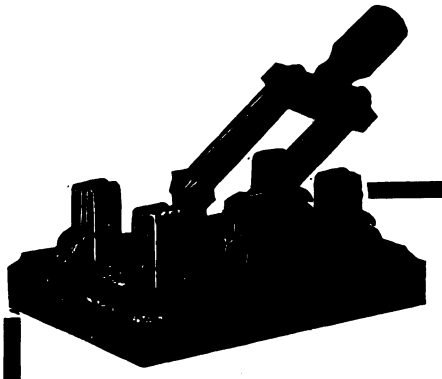

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Save Yourself Trouble and Expense

By using Double Throw Switches for your first switchboard. After you have got your bearings and know about how many lines you have in service, you can substitute a regular switchboard and the switches will be available for other purposes. The best switch for the purpose is

A Trumbull All Copper Switch

It makes positive connections and cannot get out of order. It is carefully made according to a new and exclusive design which overcomes all the troubles to which the ordinary switch is subject.

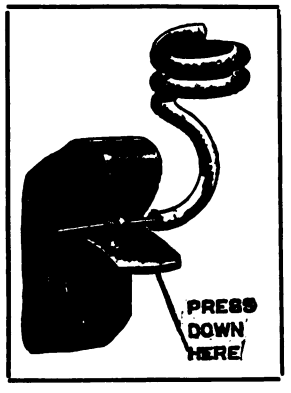
The switchboard employing these switches is the most economical form ever devised. It can be built and operated by a novice, and is absolutely free from all troubles requiring technical knowledge for their solution. If you will drop us a line to show you are interested, we will send you full particulars and quote prices that will convince you this is the type of board you need for a start.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Ave., PLAINVILLE, CONN.

YOUR DEALER NEEDS YOUR BUSINESS

Therefore you are in a position to tell him what you want and insist upon getting it.

The advantages of



The Fahnestock Spring Binding Post

have been very clearly set forth from all standpoints: mechanical, electrical and economical. It is, therefore, up to you to see that your battery orders are filled with cells equipped with this binding post. Any of the large battery manufacturers will furnish it without extra cost if it is specified in the order, so that instead of paying more, you actually save money which would otherwise be lost in maintenance charges.

Fahnestock Electric Company
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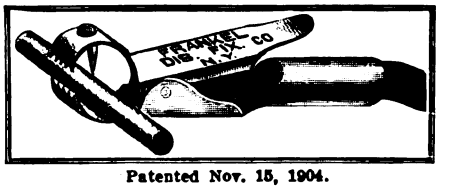

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The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect connection.

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The American Telephone Journal

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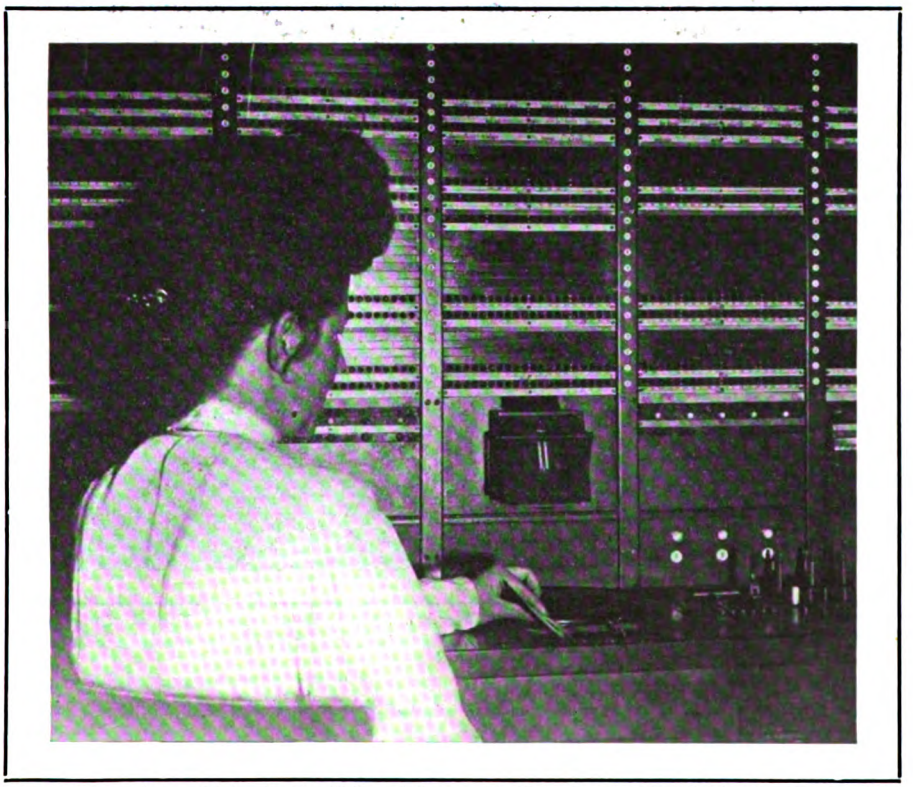
VOLUME XIII *SATURDAY, MAY 5, 1906* *NUMBER 18*

Care and Maintenance of a Pneumatic Ticket Distributing System

By E. A. Hawkins.

AFTER having reviewed in the previous article the most probable causes of trouble that may arise in the operation of a pneumatic ticket distributing system the fact will readily be appreciated that even with the most carefully handled and the best maintained plants trouble of one kind or of another will arise at some time. It will therefore be well to consider the method of locating and clearing such troubles.

These difficulties are naturally divided into several classes, of which one has to do with the motor and exhauster. The location of troubles that may arise in connection with these machines would be a simple matter for a machine attendant and therefore need not be considered further.



Operator Inserting a Ticket in the Valve of Pneumatic Tube Leading to Distributing Table. The Short Flap Points Upward.

Ticket troubles are, however, of a different and special nature. If an operator has not properly handled a ticket at the sending end of a tube, and has allowed the flap to open out while inserting the ticket, she will invariably be aware of this fact and will be on the alert to detect further symptoms of trouble with that ticket before inserting a second in the same tube. In case the ticket has unfolded, it will drop through the vertical portion of the tube leading from the top of the distributing or recording table and stop at the first bend or twist. When the unfolded ticket arrives at this point it will generally set up a noise due to its flapping on the sides of the tube. An unfolded ticket in any part of the tube will generally denote its position by means of this flapping. When such a ticket is so lodged that it does not flap under normal conditions it may sometimes be made to flap by temporarily shutting off the supply of air by placing a portion of the hand over the sending end of the tube and then quickly removing the hand. If the ticket cannot be made to flap by this means with the normal vacuum, it can invariably be made to so denote its location by an increased vacuum.

If a ticket with the flap properly folded has become stuck it will occupy a position across the tube and thus partially shut off the flow of air. The correspondingly reduced pull on a second ticket that is about to be inserted in the same tube will be detected by a trained operator in sufficient time to cause her to refrain from sending it.

In a system making use of a lamp that will automatically signal the arrival of a ticket to the sending operator a slow or stuck ticket would quickly be detected owing to illumination of the lamp.

Leaks are a frequent source of annoyance. In those exchanges that have a long exhaust pipe run from the operating room to the exhauster room it is customary to install a vacuum gauge at a convenient point in the operating room as well as on the power board in the exhauster room. Knowing the calibration constants of these two vacuum gauges it would be possible to take simultaneous readings at a time when there were no tickets being sent through the system and thus ascertain whether there were an excessive drop in the exhaust pipe between the two gauges. It would, of course, be necessary to take into consideration the normal drop due to friction of the moving air through the pipe. This could be ascertained by actual readings taken when the system was first installed and known to be free from leaks. It could also be computed from standard tables. After determining that there was a leak somewhere along this exhaust run, its exact location could be detected by the use of a candle or other flame placed near each of the joints in succession. Since the direction of flow of air would be into the tube the flame would be attracted to that point. If the leak were a bad one it would be evidenced by a whistling sound.

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A leak in the seat of any sending valve would be indicated by the sluggish action of the tickets that were being inserted into the common tube run through other sending valves further out toward the end of the run. If a leak happened to be on the last sending valve of the run it would do no harm, since the tube is open at that valve. The existence of a leak in any receiving valve would be made known by the fact that a ticket would have a tendency to remain in the receiving chamber and not fall out when the valve was opened.

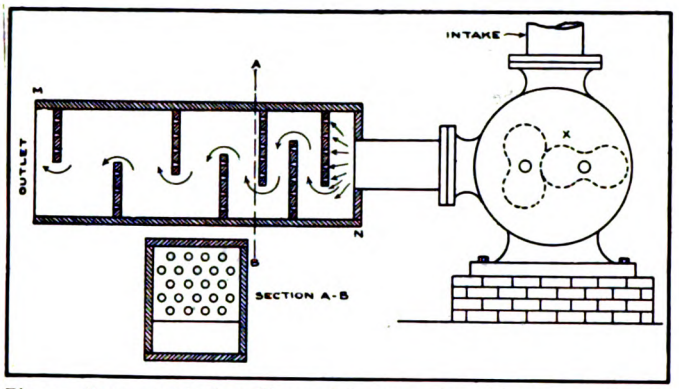
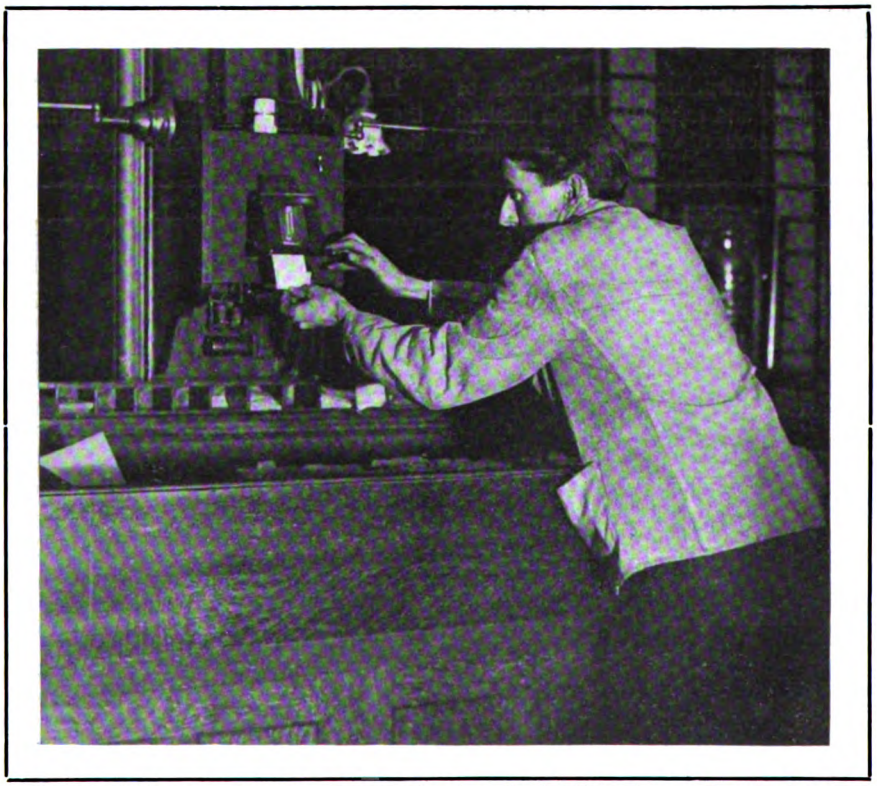


Fig. 1. Arrangement of muffler used in connection with exhauster for preventing noise in tubes.

Any leaks in the ticket tubes or branch exhaust pipes, if of a serious nature would be indicated by the decrease of pressure at the sending ends of such tubes. The operator could easily detect such a leak by the slowness with which the ticket would leave her hand.

After the nature of the trouble is established the next step is directed toward its removal. Since the troubles that may arise in connection with the motor or exhauster are no different from those which machine attendants very frequently come in contact with, the clearing of the same need not be considered here. In this connection it may be well to mention the fact that an exhauster, when run at a speed necessary to produce the required vacuum on the system, sets up a noise that sometimes proves to be a serious source of trouble. This noise is inherent with this class of machinery. It is produced by the blades of the exhauster setting up vibrations in the air which is being driven through the outlet of the exhauster. This noise grows in volume and is raised in pitch as the speed of the exhauster is increased. In order to eliminate this noise it is necessary to break up the wave motions that have been produced in the air by the exhauster. The general principle of muffling this noise is illustrated in Fig. 1.

In the figure "X" represents the exhauster and M N the muffler. This muffler is more efficient when made of a more vibrating material, such as wood. By the passing of the air around the partitions and through the holes in the partitions, as indicated by the arrows in Fig. 1, the heads of the sound waves are taken off and the waves are superimposed upon one another and so the pitch of the noise is modulated and the volume decreased to an amount that is not objectionable.



Removal of Ticket from Receiving Valve. This is a Special Tube from a Trouble Operator's Position to the Testing Room for Carrying Tickets Bearing Information for the Wire Chief.

Ticket troubles may be divided into three general classes, being due respectively to open flaps, sticking in the tubes and slow passage.

After a case of trouble has been located the most expeditious manner of clearing it would be entirely dependent upon the character of each individual case. If the trouble is known to be an "open flap" ticket or a "stuck" ticket, and it has been found to be near the sending end of the tube, a "suction box" should first be tried. Such a box is illustrated in Fig. 2.

In the figure "M" represents the "suction box," which is of a suitable size to properly cover the ends of about six (6) tubes. "N" represents a spring fitted with a knob, and "X" and "Y" represent the sending ends of ticket tubes. Suppose, for example, that a ticket was stuck in tube "X." This box would be placed over the ends of the tubes "X" and "Y" in such a manner that the compartment containing the glass window in its top would be directly over the tube "X." The flow of air through the tube "X" should be reduced by means of the cut-off valve located in the exhaust at the receiving end of the tube. The partial vacuum produced in this box by the flow of air through these five tubes marked "Y" would in turn cause a flow of air through the tube "X" into the suction box and out through the tubes "Y," as indicated by the arrows. This reverse flow of air through the tube "X" may be sufficient to start the ticket and cause it to return to the box. Upon the return of the ticket to the box it can be seen through the glass window and can be held securely in its compartment by means of the spring "N," which can be operated through a hole in the end of the box.

If a ticket is so located in a tube that it cannot be removed by the suction box, a piece of heavy paper or card folded in the manner shown in Fig. 3 should be sent through the tube. This piece of card on heavy paper, shown at "R," is known as a "chaser."

The flaps "P" and "Q" rubbing along the inner sides of the

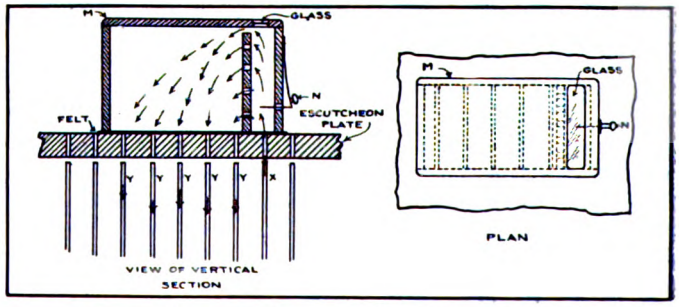


Fig. 2. Device used for removing ticket stuck in tube.

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tube, would have a tendency to engage with a "stuck" or "open flap" ticket and carry it along through the tube. The "chaser" is more effective with the cut-off valve in the exhaust of the tube wide open, in order to get the benefit of the full pressure.

In case the "chaser" fails, the next step would be to increase the vacuum on the tube containing an "open flap" or "stuck" ticket. This can generally be done by opening wide the cut-off valve in the exhaust pipe of that tube. If, however, this tube happened to be the one of greatest resistance, which would of course be operated with its cut-off valve wide open, then it would be impossible to so increase the vacuum. This increase of pressure, when possible, will sometimes be sufficient to dislodge the ticket.

If the ticket has become lodged against some obstruction in the tube, it will readily be seen that a further increase of pressure may only tend to jam the ticket still harder against the obstruction. If the flow of air was stopped temporarily the ticket might then fall away from its obstruction and continue on its passage when the flow of air was resumed. This temporary stopping of the flow of air can be accomplished by snapping down the handle of the receiving valve, which would temporarily close the exhaust port. This could also be accomplished by rapidly closing and opening the cut-off valve. The manipulation of these valves in this manner or any one tube does not in any way interfere with the operation of the remainder of the system.

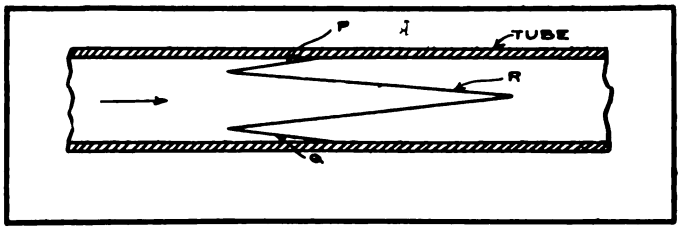

Fig. 3. Sectional view showing chaser in tube.

In case all of the above methods fail, it will be necessary to pull a chamois "cleaner" through the tube by means of a steel snake or a heavy line. The method of getting this steel snake or heavy line through the tube by means of a light line first drawn through by a "carrier" has been described in a previous article. A "cleaner," such as was illustrated in the same article, will invariably move the ticket, although it may take several passages of the "cleaner" to work the ticket entirely through the tube.

In case several succeeding "chasers" may likewise have become lodged in the tube, it would be impossible to get a "carrier" through the tube on account of the flow of air being reduced by the partial or total stoppage of the tube. Such a case of trouble can generally be cleaned by means of a steel snake shoved through the tube. In case the steel snake fails to dislodge the wad, it will be necessary to remove that section of the tube in which it is contained. The exact section which should be taken out can be determined by measuring off on the outside of the tube the distance that the steel snake was inserted.

In the case of failure to recover a "stuck" or "open flap" ticket by any or all of the above methods, it will be necessary to likewise remove the section of tubing containing that ticket. If it can not be determined in which section the ticket may be located by means of the flapping described above, the desired section must be located by a "cut and try" method.

In order to repair a leak in any pipe, an extremely hot pencil flame is essential. No soldering should be done on any of the ticket tubes while the vacuum is on the system, as the atmospheric pressure will tend to force the solder through the joint and it may then form a globule on the inside of the tube which might prove to be an obstruction to some future ticket.

A large amount of trouble is due to the accumulation of dust and moisture upon the inside of tubes, and this is a case where the old proverb about the ounce of prevention and the pound of cure particularly applies. The unclean condition of the tubes is due in a large degree to deposits from the air drawn in through the openings at the distributing table. In addition to keeping the room in which this has been located in an exceptionally clean condition, the erection of a suitably designed booth enclosing the table has been found to be an efficient means of preventing such troubles.

Instructions for the Distribution of Accounts of the United States Telephone Company

THE United States Telephone Company was the first Independent company to put in operation a comprehensive and successful system of long distance lines. The extremely efficient management and success of this company, both from the operating and financial points of view, give to all information concerning its methods an exceptional value and interest. Through the kindness of the general manager, Mr. C. Y. McVey, we are enabled to present the plan of distribution of its accounts, as follows:

REVENUE STATEMENT.

No. 1, Tolls.—This sub-division shall include all tolls and mileage, including that of other companies.

No. 2, Line Rentals.—This sub-division shall include all line rental, either telephone or telegraph.

No. 3, Miscellaneous.—This sub-division shall include all other earnings.

TOTAL REVENUE.

This shall be the total of tolls, line rentals and miscellaneous.

DEDUCTIONS FROM TOTAL REVENUE.

Other Companies' Revenue.—This sub-division shall include all mileage, commission of other companies and messenger service.

Discounts.—This sub-division shall be the discount on toll service contracts.

GROSS EARNINGS.

This account shall be the total revenue less other company's tolls, mileage and messenger service, also discount on toll service contracts.

OPERATING.

No. 1, Superintendence.—This sub-division shall include salaries of traffic manager and his assistants, also a portion of the salaries of district managers and a corresponding share of the salaries of clerks employed in the district manager's office, chargeable to operating as fixed by the general manager.

No. 2, Traveling.—This sub-division shall include expenses of traffic manager and all other employes while traveling on operating business.

No. 3, Toll Board Operators.—This sub-division shall include wages of toll board operators.

No. 4, Pay Station Expenses.—This sub-division shall include all expenses of operating this company's toll and pay stations, salaries of attendants, rent, light, heat and commissions on account of pay station.

No. 5, Stationery.—This sub-division shall include the cost of toll tickets supplied to agencies and all forms used by traffic department, the cost of preparing, printing and issuing tariff and routing books, together with their supplemental bulletins and transportation charges and postage on same.

No. 6, Office and Exchange Expense.—This sub-division shall include incidental supplies furnished for operating rooms and traffic department offices, other than furniture and fixtures, and shall include toilet supplies and towel service for such offices.

No. 7, Power.—This sub-division shall include all power used for operating toll boards and instruments, and devices for cooling operating rooms and charging storage batteries.

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No. 8, *Morse.*—This sub-division shall include that portion of Wire Chief's salary chargeable to Morse operating; the amount of same to be decided by the general manager.

MAINTENANCE.

No. 1, *Superintendence.*—This sub-division shall include a portion of the salary of superintendent of maintenance, district managers and a corresponding share of the salaries of clerks in this department and their traveling expenses while on maintenance work. The amount of above salaries chargeable to this sub-division shall be determined by the general manager.

No. 2, *Stationery.*—This sub-division shall include the cost of stationery and postage used for maintenance purposes including time books, work reports and other blanks for the use of the maintenance department.

No. 3, *Wire Chiefs.*—This sub-division shall include that portion of the wire chief's salary not charged to operating. Residence telephones allowed wire chiefs and station linemen to be charged to this account.

No. 4, *Telegraph Equipment Repairs.*—This sub-division shall include all labor, material and supplies used in the repair of strictly telegraph equipment and transportation on same.

No. 5, *Telephone Equipment Repairs.*—This sub-division shall include all labor, material and supplies used in the repair of booths, telephones, pay stations, pay station signs, booth fans and booth furnishings, together with transportation on same.

No. 6, *Tool Repairs.*—This sub-division shall include the cost of repairs on tools used exclusively for maintenance work and carrying charges on same when shipped for repairs.

The cost of new tools shall be chargeable to tool account.

No. 7, *Transferring Equipment.*—This sub-division shall include the cost of labor and material used in transferring telephones, pay stations, telegraph instruments and booths; also transportation of same.

No. 8, *Renewal of Batterics.*—This sub-division shall include the cost of battery jars, zinc, coppers, carbons, sal ammoniac, blue vitriol and other supplies used in renewing telephone and telegraph batteries. Also labor and transportation charges on same.

No. 9, *Terminal Repairs.*—This sub-division shall include all material and supplies and labor for repairs to inside cables, terminal protection, power machinery and transportation charges on material and supplies.

No. 10, *Interior Wiring and Fittings.*—This sub-division shall include all material used for the maintenance of interior wiring or fittings; also labor and transportation charges on material.

No. 11, *Toll Board Repairs.*—This sub-division shall include the cost of labor and material for the repair of toll boards. Also transportation charges on material.

No. 12, *Line Repairs.*—This sub-division shall include labor and material used in the repair of pole lines, wire, and all outside cables, also transportation charges on material. This does not include cost of transferring of lines, covered by extraordinary maintenance.

No. 13, *Damages.*—This sub-division shall include amounts paid in settlement of claims for damages arising from line changes, tree trimming, etc., and expense of adjusting such claims, except expense incurred by the legal department.

No. 14, *Traveling Expenses of Linemen.*—This sub-division shall include all expenses allowed linemen while traveling on account of maintenance, no matter whether for inside or outside work. When a wagon either single or double is used on maintenance, the expense shall be charged to the sub-division covering the work being done. When maintenance linemen are engaged on new work, any expense allowed must be charged to the proper sub-division of construction.

No. 15, *Building Expense.*—This sub-division shall include the expense incurred for repairs to buildings or real estate owned or leased by this company. Expense incurred for permanent improvements shall be charged to the proper sub-division under construction.

No. 16, *Extraordinary Maintenance.*—This account shall include the cost of all labor and material together with the transportation charges used in moving pole lines and transferring circuits, by order of the courts, municipal, county or township officers, corporations or individuals. Authorization for doing this kind of work must be received from the general office, where a number will be assigned to each authorization, and all vouchers for that particular piece of work shall be marked with the number assigned, prefixing Ex. before the number. This will enable us to determine how much it is costing to do any work of this kind.

GENERAL EXPENSE.

No. 1, *Salaries of Officers.*—This sub-division shall include the salaries of all general officers, with the exception of the general counsel.

No. 2, *Salaries of Clerks.*—This sub-division shall include the salaries of all general office clerks, to wit: The office of the president, general manager, secretary, treasurer, auditor and toll accounting departments, but shall not include the salaries of clerks in the office of the general counsel. In case of clerks working on construction, the time shall be charged to the proper heading under construction.

No. 3, *Office Expense.*—This sub-division shall include car fare and meals of general officers and the clerks from the general office, when detained on company business. Also all other incidental office expenses which are not specified particularly in other sub-divisions of general expense, including all rentals paid for telephone for general office purposes.

No. 4, *Traveling Expenses.*—This sub-division shall include all traveling expenses pertaining to work of the general office, excepting that of the general counsel and traffic departments.

No. 5, *Legal.*—This sub-division shall include the cost of legal blanks, the service and return of legal documents and fees paid to attorneys specially employed. Also the salaries of the general counsel and the clerks employed in the legal department, and the office and traveling expenses of that department.

No. 6, *Rent, Light and Heat.*—This sub-division shall include rent, light and heat for all offices. Where the company rents an entire building and sub-lets a portion of it, such rental shall be credited to this sub-division. Rent received for property owned by the company shall be credited to a separate income account.

No. 7, *Warehouse.*—This sub-division shall include a portion of the salary paid warehouse men, also a portion of the rent, light and heat of warehouse, chargeable to general expense, as fixed by the general manager. Warehouses used for construction purposes should be charged to No. 12 under construction.

No. 8, *Stationery.*—This sub-division shall include the cost of all stationery, blanks and postage for general offices other than the office of the general counsel, traffic and maintenance departments. Also the cost of telegrams and toll messages pertaining to general office.

No. 9, *Accidents and Injuries.*—This sub-division shall include amounts paid in settlement of claims arising from personal accidents or injuries.

No. 10, *Advertising.*—This sub-division shall include the cost of all advertising, pamphlets, publications and newspaper insertions; also the salaries and expenses of advertising agents.

No. 11, *Insurance.*—This sub-division shall include the premiums on fire, indemnity and casualty insurance.

No. 12, *Franked Tolls.*—This sub-division shall include all toll bills franked on account of this company's business, or as a courtesy, or for advertising purposes. The latter shall include free coupons and card franks issued for the purpose of increasing the company's business.

NET EARNINGS.

This shall be the balance of gross earnings after deducting expenses.

FIXED CHARGES.

No. 1, *Taxes.*—This sub-division shall include all state, city and franchise tax.

No. 2, *Bond Interest.*—This sub-division shall include all interest paid on the mortgage bonds of this company.

No. 3, *Miscellaneous Interest.*—This sub-division shall include the interest or discount on all miscellaneous loans.

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No. 4, Leased Lines and Contacts.—This sub-division shall include all rentals paid for leased lines and contact privileges.

No. 5, Reserve for Depreciation.—This sub-division shall include all reserves for depreciation.

No. 6, Reserve for Uncollectible Accounts.—This sub-division shall include all amounts reserved for bad debts.

Furniture and Fixtures.—This account shall include the cost of all desks, office chairs, cabinets, etc., costing $2.00 or over. Articles costing less than this shall be charged to office expenses. Shelving and temporary work of any kind shall be charged to whatever it is to be used for. Authorization must be received from the general manager before purchasing any furniture or fixtures.

Stock.—This account shall include the cost of all material and equipment purchased as a supply to be drawn from when needed. Material and equipment when purchased for some particular work, shall be charged directly to the account for which it is to be used. If the work is being done under an estimate the material or equipment shall be charged to the estimate number. Freight on the material purchased for stock shall also be charged to stock and credited to stock as the material is used.

Tools.—All new tools purchased shall be charged to this account and when tools are lost, broken or worn out, this account shall be credited with same and shall be charged either to depreciation or the particular work on which they were used as may be determined by the general office.

CONSTRUCTION.—GENERAL.

No. 1, Superintendence.—This sub-division shall include the salaries of the engineer and his assistants and their traveling and office expense when on construction work. The salaries of engineers when employed on maintenance work to be charged to the proper sub-division under maintenance.

No. 2, Stationery.—This sub-division shall include the cost of all postage and stationery used exclusively on construction work.

No. 3, Accidents and Injuries.—This sub-division shall include amounts paid in settlement of claims for damages to property or injury to persons arising from accident, when such damage or injury occurs during the construction of new work. Also the services and expenses of attorneys and others employed to effect a settlement.

INSIDE WORK.

No. 4, Labor.—This sub-division shall include the cost of all labor employed on new construction from the lightning protection in, except when same is covered by an estimate.

No. 5, Material.—This subdivision shall include the cost of all material together with transportation on same, used on construction from the lightning protection in, except when the work is covered by an estimate.

No. 6, Traveling Expense.—This sub-division shall include the cost of all traveling expenses other than those from the general office, in connection with the construction work from the lightning protection in, except when same is covered by an estimate.

No. 7, Tool Repairs.—This sub-division shall include the cost of repairs to all tools when used on construction work from the lightning protection in, except when same is covered by an estimate. The transportation on all tools shall also be charged to this account.

OUTSIDE WORK.

No. 8, Labor.—This sub-division shall include the cost of all labor employed on outside construction up to and including the lightning protection in the office, except when same is covered by an estimate.

No. 9, Material.—This sub-division shall include the cost of all material, together with transportation on same, used on outside construction work up to and including the lightning protection, except when same is covered by an estimate.

No. 10, Traveling Expenses.—This sub-division shall include the cost of all traveling expenses other than those from the general office in connection with outside construction work, up to and including the lightning protection, except when same is covered by an estimate.

No. 11, Tool Repairs.—This sub-division shall include the cost of repairs to all tools when used on outside construction work up to and including the lightning protection, except when same is covered by an estimate. Transportation on all tools shall also be charged to this account.

No. 12, Warehouse.—This sub-division shall include the salary of warehouse men, rent, light and heat of warerooms and pole yards in storing construction material, as fixed by the general manager.

RIGHT OF WAY.

All expenses in connection with right of way shall be charged to this account.

The Growth of an Independent Co-operative Company*

By H. H. Hutchins.

THE Saugatuck and Ganges Telephone Company, Ltd., was started in 1895 by a few fruit growers combining with local steamboat men for the erection of lines reaching into the fruit sections of the western part of Allegan county from shipping points. About two dozen telephones were first installed, each subscriber paying the entire cost of his connection. It soon became necessary that we associate ourselves and elect officers for the management of the little system, which was done in 1896. A provision in the by-laws was that each subscriber pay for all material required for the maintenance of the telephone, and that each should bear his pro rata share of the cost of the maintenance and operation of the system.

The management has since agreed that where several desire to connect to our centrals by party line the company will run the wire to the vicinity and allow the subscriber to connect thereto free of line charge.

All supplies and instruments are furnished at actual cost and the work is done by experts in the employ of the management at as low a rate as possible, looking forward to the benefits to be derived from the ability to reach as many as possible of the members of the community.

The system is purely co-operative and no dividends accrue, sufficient charges only being made for service to cover maintenance and operation.

Officers are elected from among the shareholders annually, which places control in the hands of people who have no object in the matter other than efficient service at as reasonable a figure as possible.

The growth and efficiency of the enterprise are too well known here to call for comment and to extend thanks to any one would be merely self-congratulation, since it is the outgrowth of an enterprising community who operate it according to their own liking, through managers elected annually from among their own number and who are residents of the community.

When the little plant was first started no one knew anything about telephone matters and but very few in the community had ever talked over a wire. Accordingly, the general impression was given out that there would be no cost after installation. Switchboards were placed in stores and business places at the five centers—Saugatuck, Douglas, Ganges, Fennville and Glenn. The attendants agreed to do the switching for nothing, as it would be fine sport, and the instruments were supposed to be as free from troubles as the piano in the parlor or the colt in the pasture. The first lot of telephones were installed by the aid of the local telegraph operator and an expert from the factory set up

*Read before the convention of the Michigan Association.

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the switchboards. Things ran smoothly during the fall of 1895 and the following winter, but in the spring of 1896 a dark cloud, soon followed by a hurricane, filled with Old Cain, rolled up over old Lake Michigan, accompanied with a terrific electric storm. Well, our lines are mostly grounded and any telephone man knows the rest.

Before six months had passed our attendants began to think it better to answer telephone calls when they could not sell goods, so the subscribers grumbled because their calls were not properly attended to. At the same time the fellow who had been obliged to leave his business to "see if he could find the trouble with the phone" began to "sit up and take notice" also. Another matter developed, that of having a head and a tail to this thing. There was no one who had authority over it and it was running wild, so a meeting of those who had donated to the enterprise was called and it was decided to organize. Three bright fellows were chosen to draft a set of by-laws. This, being of minor importance, only delayed the meeting twenty or thirty minutes, but we appreciated the fact bv this time that there must be some expense attached, so a clause was inserted providing for a pro rata charge for maintenance and operation, as mentioned above. After the usual ordeal of criticism and changing—among which was a clause providing that all matters should be referred to the shareholders for final disposition—we all signed the articles of association which had been prepared by a local attorney and, after adopting the by-laws, the meeting proceeded to elect a board of five managers.

One of the first observations of the new board was that we would be under the necessity of paying our exchange attendants a stipulated sum and that we must employ an expert to look after trifling matters which seemed to creep in to disturb the perfect working of the instruments. So an assessment of $2.50 was levied on each member, as a sufficient amount to settle all accounts to date. Things ran on in a hit and miss way until January of 1898. By this time our assessments had amounted to about $9 per year for the two and a half years we had been running. This was considered exorbitant and there were rumblings of distrust to be heard from the members and, as the board of directors were serving gratuitously, they decided to let the honors of office fall upon other members, so at the annual meeting an entirely new management was elected. Just previous to this meeting, however, the manager had a new code of by-laws carefully drawn up and signed by three-fourths of the stock, to become operative at once, so that the new board might not be hampered as the old one was by having to refer every important transaction to the stockholders.

At this time there was a deficit of about $300 and it was decided to place the business on the basis of an annual rental of $12, payable quarterly. This sum was supposed to clear the indebtedness and allow the board sufficient funds with which to run the plant and clear up all accounts. It would doubtless have met all expectations had not the fact developed that many of the pole lines were already overloaded, and more wires waiting to be strung, so that much work had to be done, and expense for material had to be met, and at the end of the second year of the new management we were about $700 deeper in the hole than when they took the reins of government. They were all good business men in their own line and strictly honorable, so our little community settled down to the conclusion that it took money to run a telephone plant as well as any other enterprise, and they voted it to be the sense of the meeting of shareholders that the board place the rental at $15 per year, which was done immediately by the new board and we have dropped out of the fence corner gossip.

At the $15 annual rental we have practically cleared our indebtedness—that is, we have sufficient amounts now due to finish doing so—and have added many improvements in the meantime. Our expense account has been swelled in the work of correcting errors in first construction and in reconstruction made necessary by over growth; in other words, in getting experience in a new business.

Our principal advantage in co-operative ownership lies in our peculiar situation. This being a fruit-growing section, it is important that our subscribers, who are mostly fruit growers, have free access to all the local marketing points, since much of their output is sold at the surrounding stations, and telephone connection with but one of the stations would be of little advantage, while a toll rate would become burdensome. As our company is mostly made up of fruit growers we can, by this plan, allow ourselves the use of the entire system by paying a sufficient rental to maintain the plant, while an outside company would be obliged to charge toll between stations for interest on the investment.

In our five exchanges we have about 200 subscribers in winter and 250 in the summer months, or an average of about fifty to the exchange when all are working. Our rates are $2 per month for three months, $1.75 for six months, $1.50 for nine months and $1.25 for annual rental.

By the friendly toleration of the large Independent companies who control the long-distance lines passing our section we are enabled to reach outside points over their wires and at the same time maintain our local institution to our own liking.

Were it not for the peculiar conditions, our perishable crops and the consequent necessity for free access to our surrounding shipping points, both by rail and water, I could see no advantage in co-operative ownership and management.

PROGRESS OF MANITOBA LEGISLATION IN FAVOR OF MUNICIPAL SERVICE EAGERLY WATCHED.

THE Hon. Colin Campbell, Attorney General of Manitoba, introduced legislation during the recent session which he hopes will have the effect of cutting telephone tolls in two and equipping the average farmhouse in Manitoba with a telephone. The Government proposes to supplant the Bell telephone system and own the long distance lines, and it will ask power from the Dominion Government to expropriate Bell lines.

Municipalities will be allowed to take a vote as to whether they will construct their own systems, the Government undertaking to render the necessary financial aid. If the municipalities decline, the Government will step in and build the system.

Where systems are installed by the municipalities they must come up to a satisfactory standard. The Government will finance the scheme, endorsing the bonds of the municipalities, the tolls decreasing when the bonds are finally paid off. Hon. Mr. Campbell points out the success which has attended municipal telephones in England and in other parts of Canada. In Neepawa, Man., he says that the people pay $10.00 for residence and $20.00 for business telephones. In Port Arthur and Fort William, where there is municipal ownership, subscribers have increased from 200 to over 1,300 in about three years.

If Manitoba should succeed in getting permission from the Dominion Government to expropriate the Bell system, that company will evidently have to either considerably reduce its rates or fight for its life in every province in the Dominion. Cheap telephones would be an extraordinary boon to the people of the country districts of Nova Scotia, and they would be adopted eagerly. There are already one or two private lines, one of which at least, started by T. J. Sears, of Lochaber, in Antigonish County, is said to have proved to be very successful in operation.

NO TELEPHONE CONNECTION BETWEEN THE LONDON POLICE SYSTEM AND THE CITY EXCHANGES.

ENGLISH conservatism is proverbial, but it would appear to have reached the point of foolishness when it is known that the metropolitan police force of the city of London has no telephone connection with the local exchanges. The official reason given for this peculiar state of affairs is that "serious inconveniences and danger to the system would result if the general public were allowed to ring up Scotland Yard!"

The argument is also advanced that criminals would be enabled to secure information which they could not otherwise obtain.

A movement is now on foot to urge reform measures which will result in the private police system being connected with the city lines, so that any citizen can ring up the department when in need of assistance.

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Why the Ohio Association Should be Maintained *

By Frank A. Davis.

IN the first place this association ought to be maintained because you ought to be proud of it. It has given to this state, and it has given to the telephone interests, as I am informed by people from outside of the state that are here now, the best Independent telephone convention that has ever been held, and I believe that it is true; not the largest, but there is a better feeling and better spirit here among you gentlemen now than there ever has been in any Independent telephone association that I ever saw. In the last year you have accomplished more in the way of advancement, in the way of growth, in the way of helping our material interests than any one and possibly than any two or three years before. It has been said here that the number of independent telephones has increased in the last twelve months from less than a hundred and ninety thousand to approximately two hundred and fifty thousand. It could be said, and possibly has been said to-day that the number of Independent stockholders in the state of Ohio in that time has increased from something less than eighteen to something more than twenty-one thousand. It can be truthfully said that at no time in the history, and nowhere has there been the growth and increase in every way that you have had in Ohio this last year.

More important than anything to us, our telephone securities have come to be regarded in quite a different light. In Columbus, in Toledo, in Cleveland, and in other places in this state people are now regarding the Independent telephone securities as a desirable investment; heretofore they have been looked upon with a great many questions. This association during this last winter has done magnificent work in this legislature, not in the way of lobbying, nor in any corrupt way, not in any immoral way, if you please, but it has conducted a campaign of education, it has shown the honorable members of the General Assembly that we have a large and important, a growing industry; that we are in this business on the right basis, that we only desire fair treatment, and we have insisted on that fair treatment; they have listened to our arguments, and there has not been a single law passed really obnoxious to the Independent telephone interests. We did not get all the legislation that we desired, but we have not been very seriously hurt.

I think this association should be maintained for the purpose of conducting the education of the people on these questions; there are going to be other legislatures, in fact this same legislature will be with us two years hence. We ought to get together, we ought to educate the people on this question of taxation. We ought to be able to show them the fallacy of Tom Johnson's or Senator Howe's so-called franchise tax; go to work now and educate the people on these propositions; show them that we are in a legitimate business, exercising and enjoying no peculiar privileges, and the same laws that apply to us ought to apply to other corporations and that there ought not to be any laws applying to telephone properties as corporations unless applied to other corporations making similar profits and under similar circumstances. Conduct a campaign of education as to the desirability of the telephone. In an article in the March number of *Success* there is advanced a theory which shows us that the economic value of the telephone is more than fifty dollars a year. It takes up a case in Rochester where a man started to have a telephone circuit and would not put in the Bell on account of the high rates. One grocery there, with an expenditure of eight hundred dollars a year for a wagon, could not accomplish as much as it was able to do with one telephone, at nothing like that. Taking into consideration the value of the telephone in the time it saves, in the purposes it accomplishes, it is easily worth more than fifty dollars a year. What does that amount to? With us in this county, because I am familiar with the figures here, we have something over ten thousand; if that is true we are adding five millions to the economic value of this county; saving that amount of money.

These matters can be brought to the attention of the people. Take this matter of Cincinnati that Judge Mathews speaks about; it has occurred to me since he was talking that this association can educate the people of Cincinnati so that they will no longer be opposing the Independent telephone, but will be very glad to get it. It may take weeks, may take months, but that education is bound to come. Cincinnati knows what it has suffered in southern trade by its policy as compared with St. Louis. Those cities are no longer rivals; Cincinnati is but a village, with all respect to Judge Mathews, as compared with St. Louis, on account of a different policy. The same idea would be brought home to Cincinnati in the telephone business. She is standing altogether in her own light, and the most desirable thing that could come to Cincinnati is a new telephone company, extending its lines of trade, extending the territory in which it is doing business.

Just by way of illustration; when we started the Independent company in Columbus we had considerable difficulty with the railroad freight offices, and in getting our telephones into the express offices. Our friends in Columbus took the time upon themselves to write innumerable letters. It would be the work of days to count them, but on these freight agents' desks every morning there would be thirty or forty or fifty letters from people receiving shipments, urging the necessity of communicating with the Independent telephone subscribers. It was not long before they were all very glad to come in and take our service, and did take it. If the men who have been here assembled to-day would, among their constituents, so to speak, start out on this campaign of education, Cincinnati could be flooded with letters of the sort indicated and the people would soon be convinced that they were not only losing thousands, but millions of dollars; they are losing a great deal of money to-day by not being connected telephonically. It could be brought to them where they would realize it at once, and no sort of political organization, with the busness men of Cincinnati could prevent that Independent service getting into Cincinnati. For these reasons and many others this association should be maintained; it gives me great pleasure to add that I believe your present president should be maintained in his office. The amount of work he has done is something wonderful; he fills the position better, I think, than almost any man ever filled a position. It has been through his efforts that very much of this has been accomplished and I am sure that you are glad he is president and give him most hearty cooperation. He has always been ready to extend to every telephone company, to every exchange, a helping hand; and speaking of helping hands I am reminded of a little squib I saw the other day, written by some novelist, I think, "With one hand he held her sweet pale face above the surging billows, and with the other he called loudly for help." Now, gentlemen, that has been Mr. Beam's attitude; with one hand he has held the struggling Independent above the water, and with the other called loudly for help—and contributions.

* Delivered at the banquet of the Ohio Independent Telephone Association.

AGITATION FOR CHEAPER RATES IN GREAT BRITAIN.

CHEAPER telephone rates is the urgent demand in England, and a struggle to secure probably the lowest rate on record is to be begun by John Henniker Heaton, M. P., who expects to begin his fight in the House of Commons in a few days. Mr. Heaton thinks that a shilling a week, equal to about 24 cents American money, is all that British householders ought to be asked to pay.

Mr. Heaton is the famous champion of cheap postage, and is confident of crowning his career with procuring cheap telephone rates. He has been in communication with the postmaster general of Australia, who thinks that the shilling rate for telephones is not unreasonable.

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THE EDITOR'S PAGE

THE PNEUMATIC DISTRIBUTION OF TICKETS.

A PECULIAR tenderness and susceptibility to variation in external conditions have made the development of the pneumatic distributing system a much more difficult proposition than was probably suspected at the time the scheme was first suggested. Engineers who undertook the work were compelled to investigate a problem which was wholly new to telephone practice, and were without a precedent in their own experience to guide them. As soon as a start had been made it was found that a great number of special difficulties arose, and a course of experiments had to be conducted with the greatest care, in order to devise methods of surmounting the obstacles which were found to exist. It was necessary to provide a plan of operation which should secure the passage of tickets at a rate of speed which would enable the operating companies using the pneumatic tubes to effect a saving in time which would make the pneumatic system economical as compared with the existing plans of distribution by messengers then in use. It was found that the conditions occurring in actual practice were so variable that the most patient investigation was required, among other things, to determine the proper vacuum. This was complicated by the fact that the amount of pressure must be varied with the amount of business being transacted, as it will be readily recognized that the constant opening of a large number of valves has a greater effect upon the pressure than occurs when only a small number of tubes are in use. Consequently it was necessary to provide a system capable of being controlled in such a manner as to secure a proper working efficiency at all periods of the day, and through all possible variations of the exchange load.

Then again a further complication was introduced by the fact that a vacuum suitable for tickets of a certain weight is far from being capable of securing best results when tickets of another grade of paper are used. With these two variable quantities the proper dimensions for each could obviously be determined only by a long and careful series of experiments. Yet further, the length of the flap on the tickets was found to be a factor capable of exercising an appreciable influence upon the speed of passage, and upon the probability of its reaching its destination without being stopped in some more than usually difficult portion of the tube.

The inner surfaces of the tubes collect dust and moisture to a considerable extent when exposed directly to the air of an ordinary operating room, and a deposit of this sort results in a slowing down of the tickets, and is liable to cause an interruption, or the temporary loss of a ticket at a time when such delay can least be afforded. The nature of the paper used for the ticket was found to be very important in reducing its liability to be affected by these conditions. Then, of course, it was necessary to make the gathering of these deposits upon the inner surface of the tubes as difficult as possible, and various schemes for protecting the distributing tables, where the air is drawn into the tubes in a constant stream, have been put in operation. The final result has been that the operation of the tubes is reliable to an extent which approaches the security attained with any other telephone apparatus. The troubles which occur are now of such a nature as to be readily located, and the frequency of their occurrence is not unduly great. In view of the difficulties encountered, and their extremely annoying nature, combined with the fact that they were of a sort beyond the knowledge of the ordinary telephone engineer, the results attained reflect the highest credit upon the ability and versatility of the men who have adapted the pneumatic carrying system to the needs of a telephone exchange.

A CASE OF WASTED EFFORT.

IT'S a pity that some of our telephone patent seekers can't be taken off the job and put to good honest work digging on a pole line route. Those who are best informed tell us that there is no industry in which the actual course of development has been along lines more true to the requirements of pure science and of correct business reasoning than in the furnishing of telephone service. Yet nearly every week we see one or more government documents which prove that somebody has been wasting his time in an utterly misdirected effort to solve a problem that is too big for him. And when he has gone so far, and put his money into the purchase of a statement that the idea is his very own, for weeks and months thereafter we have alternating before us sad visions of the bored general manager and the again disappointed inventor.

This all comes from a man's tackling the main problem before he is ready. It is all right for a man who has been burying guy stubs to want to design an anchor that will hold just as firmly, and be capable of being set in a fraction of the time, and that without digging. And it's all right for him to try to make an anchor that will do the business, too. But before he goes ahead he should find out just what his anchor has to do. It is impossible to solve a problem completely without covering all the details. The man who makes the anchor that is used is likely to be the one who is not only familiar with the looks and feeling of various kinds of ground, but the one who knows the amount of pull in pounds that is exerted by a guy under the various practical conditions which come up. He will know, too, in definite terms the resistance to compression of the various kinds of earth, the force with which it resists withdrawal, the strength of materials of which his device can be made, and the effect produced by numerous different forms of blades. It takes time and thought and experiment to learn these things. Nevertheless they are conditions that must be met, and in these days it is unsafe to trust to an inspiration when one has to overcome physical difficulties.

This first illustration is mentioned because it deals with a type of apparatus which has led on many people through sheer enthusiasm. It looks so easy! Then there is another kind. Almost everyone who has an opportunity to observe telephone circuits in operation sees where human labor could be saved by the automatic accomplishment of certain functions. He reasons that a labor saver is a money maker, and sets out for the goal. No matter whether it be a selective lockout party line system or an automatic exchange, he gets a foundation scheme of some kind and starts to develop it. Then as difficulties arise part after part is added until there is not a spring, nor wheel, nor pawl left in the old alarm clock that is his base of supplies.

After a while it may get to a point where it will do a lot of things. The patent papers are drawn up, and they may get through the office. If they do he starts out to sell it, and he never realizes his position until the general manager puts his questions: "How much will it cost? How long will it last? If I buy a thousand, how many extra men will I have to hire to keep them working?" Then he sees.

In the telephone business, as in so many others, the unattached inventor has a hard row to hoe. If he starts in too early in the seasn he is likely to get tired before he has assured himself of a flourishing crop.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. MCMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

NOTICE OF PAINTING POLES.

The statutes of Vermont require persons owning or operating a line of wires in a city or village to cause the poles on which the wires are strung to be kept suitably painted to the satisfaction of the aldermen and to substitute straight poles for crooked ones. The law also provides that a failure to paint the poles or to make a substitution of straight ones for crooked ones within 20 days after notice shall cause the company to forfeit $100 to the city, to be recoverable in an action upon the statute. The city authorities gave us a notice, but did not say in it what poles should be taken out and replaced, nor what color our poles should be painted. Can they recover the $100 from us? S. C. S.

THE notice should have directed where a substitution of poles should be made and what color they should be painted. If the notice did not so state, the city cannot recover the penalty. The statute is a penal one and should be strictly construed. Village of Hardwick v. Vermont Tel. Co., 40 A. 169.

DULY AUTHORIZED TELEPHONE COMPANY IS NOT A NUISANCE.

The owner of a piece of property in the city sued our company for damages caused by our setting two telephone poles in front of his place, and the only verdict he got was for $1 and costs. This we paid. Now he sues over again and claims the location of our poles in front of his lot is what he calls a continuing nuisance for which he can sue as often as he wants to, if we don't move our poles. Can he keep suing us in this way? Our company has a franchise from the city and a charter from the State under the law. L. E. T.

IF the maintaining of the telephone line were a nuisance this troublesome citizen could sue as often as he desired. But where a telephone company erects its line in a street by the consent of the State and the city, and pays damages therefor, it is not a nuisance. For an injury resulting to plaintiff from the construction of a telephone line in front of plaintiff's residence, he can recover but once. The grievance is permanent in character and the damages first recovered pay for the whole injury. Brown v. Southwestern Teleg. & Teleph. Co., 44 S. W. 59.

INDEPENDENT FRANCHISE VETOED IN MILWAUKEE.

THE franchise granted by the common council of Milwaukee to the West Shore Telegraph and Telephone Company, an Independent concern, has been vetoed by Mayor Rose on the ground that any Independent company may build a system without a special ordinance, and that the city has no right to give a franchise to a telephone company under existing laws. The Mayor was also of the opinion that the clause fixing the rates, the right of the city to purchase, requiring the employees to submit differences with the company to arbitration and compelling them to continue in employment while arbitration proceedings are pending, and requiring all employees to carry a paid-up card in a labor union, could not be enforced because the city had no authority under its charter to make the conditions.

INJURY FROM SAGGING WIRES.

THE Citizens' Telephone Company maintained telephone wires in the city of St. Joseph, Mo. The city itself, maintained an electric light plant and the street railway company also maintained wires in the streets. In many places they were near together, either on the same or nearby poles. A woman was hurt while passing a point where the wires of each corporation are close together, and she brought action against all three, but dismissed as to all except the telephone company. The negligence charged was that the wires were not properly insulated and sagged down, and were constructed of poor, rotten material and that they broke and fell across the sidewalk where she came in contact with them. The plaintiff recovered a judgment from which the defendant appealed and secured a reversal in the Kansas City Court of Appeals. In its decision the court held that the question of whether the telephone company had noticed that the wires were down or not was not material. Politowitz v. Citizens' Telephone Co., 90 S. W. 1039.

THREATENED BOYCOTT OF BELL COMPANY.

AT New Castle, Pa., the city solicitor advised the public to boycott the use of Bell telephones for the purpose of forcing the obstreperous company to occupy the municipal conduit, and end the attempt to increase the rates in this city. The city solicitor is of the opinion that the police powers of the municipality will allow it to order the removal of the overhead wires of the company, on the ground that they are unsafe and against the public good. To prevent this removal, the company has secured an injunction restraining the city officials from cutting down its poles. If the court sustains the position of the city and dissolves the injunction, the company will thus be legally forced to use the municipal conduit. If this should fail, and in all events during the pendency of the suit, the people of the city can, by an effective boycott, drive the company into its discontinuing overhead wires and occupying the municipal conduit, which is ready and willing to receive them.

PERSONAL INJURY FROM LIGHTNING.

A FARMER near Portage, Wisconsin had installed on his farm a telephone, the ground connection of which originally was a three-foot rod of iron driven into the ground. This ground connection proved inadequate in the winters of 1898 and 1899, and the telephone company, at the farmer's request, connected with the ground wire another wire passing over a shed roof and into a pump house and thence to the floor and fastened around an iron pump. In the spring a longer iron rod was substituted for the first one, leaving the telephone supplied with two ground connections. Subsequently, by no act of the telephone company, the wire in the pump house was disconnected from the pump, the end of it coiled up and hung upon a nail inside the pump house, upon which hung a small looking glass used by the members of the family for toilet purposes. In May, 1903, in the midst of a violent electric storm, the farmer, after washing, stepped in front of the glass and began to comb his hair with a metallic comb. Suddenly there was a flash of lightning, apparently from the end of the wire, which struck the farmer's face, rendering him unconscious and causing serious injury. There was also evidence that about the same moment lightning struck a telephone pole not far from the house. The farmer brought suit against the company for damages, but judgment was rendered in favor of the defendant. The plaintiff appealed the case to the Supreme Court of Wisconsin, where the judgment was affirmed. The grounds of the judgment in the lower court were that the telephone company was not negligent in not disconnecting the pump house wire from the ground wire, and that the plaintiff failed to exercise ordinary care in his conduct. Owen v. Portage Telephone Co., 105 N. W. 924.

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IN THE OPERATING FIELD

MISSISSIPPI VALLEY COMPANY ACTIVELY ENGAGED ON EXTENSIVE CONDUIT SYSTEM IN BURLINGTON, IA.

UNDERGROUND construction is being rapidly completed by the Mississippi Valley Telephone Company in Burlington, Ia. It is the intention of the engineers to have the major portion of the wires in the business part of the city placed in conduits by the end of the season. The company is also negotiating for a suitable site for a new exchange, and if this is secured in time the construction of a modern fireproof building will be started. The business of the company has been expanding very rapidly and to enable it to meet the demands for telephones, and also to improve the present system, these important reconstruction projects have been undertaken.

MEMBERS OF SOUTHEASTERN KANSAS ASSOCIATION HOLD MEETING.

IMPROVEMENTS and extensions were the principal subjects discussed at an enthusiastic meeting of the Southeastern Kansas Telephone Association, held recently at Mound Valley. The managers and operators of the various companies present gave very encouraging reports upon the development of the industry. At present the majority of the association are residents of Labette County, but it is the intention of the organization to expand so that all companies in this part of the state may become members. Among other matters which came up for discussion was the construction of a toll line to connect Mound Valley with Altamont, Edna, Bartlett and Chetopah. It was unanimously decided to build this line, which will enable nearly all the mutual companies to give extensive toll service to their patrons. It is expected that the line will be completed within the next six weeks.

WRIGHT COUNTY, IOWA, HAS NEW INDEPENDENT TELEPHONE ASSOCIATION.

REPRESENTATIVES of the various independent companies in Wright County, Ia., recently met at Clarion and formed an association. B. W. McElhinney, president of the Goldfield company, and F. C. Petersen, manager of the Clarion system were elected president and secretary, respectively, of the new association. A committee was appointed to draw up a constitution and a set of by-laws, which will be ratified at a meeting to be held in the near future. The following companies are at present members of the association. The Jameson Telephone Company, Dows; Sheffield company, Belmond; Woolstock company, Woolstock; Goldfield company, Goldfield; Rowan company, Rowan, and the Vernon Mutual Telephone Company, Dows.

The association expects by mutual agreements to greatly aid and extend the Independent movement throughout the country and also to increase the long distance and toll service of the various companies.

RECONSTRUCTION OF PLANT AT SCRANTON, PA. WILL PROVIDE FOR EXTENSION OF SERVICE.

IMPROVEMENTS to the Scranton, Pa., system of the Consolidated Telephone Company, which will entail an ultimate expenditure of $30,000, are now well under way. A new switchboard of the common battery type is being installed at a cost of approximately $12,000. The entire reconstruction will be completed by May 15 and the company will then be in a position to take care of a much larger number of subscribers than was heretofore possible. In the residence districts selective party line telephones are being installed, which will enable four parties to be placed on one line. It is estimated that by the first of October one thousand new subscribers will be receiving service which the company was unable to provide with its old equipments.

UNION PACIFIC TO BUILD TELEPHONE LINE.

CONSTRUCTION work upon the telephone system of the Union Pacific Railway, which is to extend from Chicago to San Francisco, has been started. James McReynolds, who has recently finished the building of a 2,000-mile telegraph line for the Postal Telegraph Company, has charge of the work. He will make his headquarters at Cheyenne, Wyo., from which point the work is to start. By the end of the year the line will have been built to Green River.

It has been decided to erect a separate pole line from the one employed for the telegraph wires. The poles are to be comparatively short and stout so as to be able to withstand the severe winter storms of the regions traversed by the railroad. The primary object of the system is to assist in the work of train dispatching and to provide a sure means of communication at all times along the entire route of the railway.

THE SUMMER SCHOOL FOR ARTISANS AT THE UNIVERSITY OF WISCONSIN.

THE attention of telephone employes and others interested in an opportunity to increase their technical knowledge is drawn to the summer school for artisans which is held at the University of Wisconsin in Madison. The sixth annual session begins on June 25 and ends on August 4., making a term of six weeks. The College of Engineering has charge of the various courses in which are given instruction covering engines and boilers, applied electricity, mechanical drawing and machine design, materials of construction, fuels and lubricants, shop work and manual training. The instruction force is taken from the regular faculty of the college and the entire laboratory and shop equipment belonging to the college is used by the students.

The requirements for admission do not extend beyond a working knowledge of English and arithmetic, but the policy is to allow a large amount of individual work so that the student may take advantage of all the preparation he has obtained. To those unable to take a regular four years' course, this school offers an opportunity of obtaining a working knowledge of the methods of testing and the use of instruments, together with such theoretical principles in each case as the nature of the subject and the preparation of the student may permit.

Correspondence students will find this school of great value in giving an opportunity for laboratory practice along the lines in which they have had theoretical instruction.

The course devoted to applied electricity is divided into nine sections, as follows: Dynamos and motors, electrical wiring, meters, transformers, lighting, telephone service, electric batteries, station records, and elementary theory of alternating currents and their applications. Instruction in each division includes lectures illustrated with apparatus and drawings and laboratory experiments.

The shop and laboratory equipment is very extensive and includes apparatus for the conducting of special as well as regular tests. As the students work as individuals rather than in classes, this school offers an opportunity for those so desiring, to pursue laboratory work along lines in which their training may have been incomplete. A fair estimate of the expense attached to the six weeks' term would be fifty dollars,

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which will be found sufficient for one's needs. This figure includes cost of tuition and living expenses, but not transportation.

A bulletin describing the work of the school in detail may be secured by applying to Frederick E. Turneaure, Dean of the College of Engineering, Madison, Wis.

GROWTH OF BUSINESS IN TOPEKA CAUSES LARGE INCREASE IN CAPITAL OF INDEPENDENT COMPANY.

REORGANIZATION upon a larger scale is being undertaken by the Independent Telephone Company of Topeka, Kas. The capital stock of the company is to be increased from $150,000 to $1,000,000 and the bonded debt increased $390,000. From the money thus secured at least $400,000 will be expended in Topeka during the next six months. A new fire proof office building of the most approved type is to be erected and the wires in the business part of the city will be placed underground. At present there are upward of 5,000 telephones in operation and the switchboard and line facilities are crowded. To enable the system to expand at the rate demanded by the citizens who wish to obtain Independent service a new switchboard will be installed which will have an ultimate capacity of 15,000 telephones. It is the intention of the company to make Topeka the telephone centre of Kansas. Several new copper toll lines are to be built which, with those in use at present, will give ample toll and long distance service. When these improvements are completed the company will possess one of the best equipped systems in the country. An aggressive campaign against the Bell is to be inaugurated at once and as the public sentiment is with the Independent company its future success is amply assured.

In connection with the plan of reorganization Theodore Gary, of Macon, Mo., and Breckenridge Jones, vice-president of the Mississippi Trust Company, St. Louis, Mo., are interested parties. Mr. Gary is president and part owner of several independent plants, among which are the Home Company, Joplin, Mo., and the Atchison (Kas.) Telephone Company. Mr. Jones is well known in independent financial circles, being interested in several large systems. The officers of the company are B. F. Pankey, president and general manager, and W. P. Hemphill, secretary and treasurer.

LONDON POSTOFFICE SYSTEM CUT OVER IN THREE MINUTES.

AN exceptionally rapid cut over was recently made when the lines of the London postoffice telephone system were transferred to the new switchboard. A new fireproof exchange is to be erected on the site of one of the present buildings and temporary quarters were found for the installation of the equipment while building operations are being conducted.

The cut over took place at 3:30 in the afternoon. While the operators were moving from one building to the other strips of tape were placed behind the heat coils on the main frame. When the signal was received that all was in readiness the tapes were pulled and the operation removed the heat coils and disconnected the lines from the old exchange. In just eighty seconds the 40,000 coils connected with the 20,000 lines had been removed. Immediately after the last line was disconnected from the old board the operators at the new exchange were given orders to plug into the answering jacks. This operation caused the cut off relays to operate, which in turn released the line relays. These had been held back from contact by insulators, which fell out immediately after their circuits were opened and the armatures released.

Those lines on which calls were being made immediately thereafter displayed the line lamp signals and business was resumed as usual. All the other lines were tested in the usual way by ringing the subscriber.

In connection with the transfer every line had been tested and measured before the change and the reports filed on cards, so that when the operators failed to raise their parties the records of the lines were consulted for location of the trouble.

NEW COMPANY ORGANIZED IN OHIO WILL CONNECT WITH OTHER INDEPENDENT LINES.

A NEW independent telephone company to be known as the Sandy Valley Telephone and Electric Company was recently organized at Alliance, Ohio. The incorporators and officers are R. S. Kaylor, president; A. S. Hillhouse, vice president; Franze D. Miller, secretary and treasurer; Morton Purdue, general manager, and W. M. Welker, cashier.

This company is capitalized at $50,000 and will operate exchanges at Malvern, Waynesburg, Magnolia and other towns throughout Sandy Valley. It will connect with the Stark County system for toll and long distance service, but is otherwise a separate institution.

Applications for franchises are now being secured and the work of construction will start at an early date so that a considerable headway will be made before the winter sets in.

HOW THE INTER-OCEAN ATTRACTS BUSINESS.

BY the kindness of Mr. Wm. A. Wadsworth, of the Inter-Ocean Telephone & Telegraph Company, Buffalo, N. Y., we are enabled to present the accompanying terse statement issued for advertising purposes. It will be observed that the designer has succeeded in getting a pretty strong argument into the space available on a small card.

WE HAVE 75,000 INDEPENDENT TELEPHONE SUBSCRIBERS IN WESTERN NEW YORK WHOM YOU CAN REACH BY NO OTHER SYSTEM. OUR LINES REACH EVERY BUSINESS HOUSE IN THE CITIES AND VILLAGES IN THIS TERRITORY.

IT WILL BE TO YOUR ADVANTAGE TO USE THE SYSTEM WHICH GIVES BETTER RATES, BETTER SERVICE, BETTER TREATMENT, THAN YOU HAVE EVER BEFORE ENJOYED.

INTER-OCEAN TELEPHONE and TELEGRAPH CO.

TOLL COUPON SOLD AT A DISCOUNT.

UTAH COMPANY DECLARES SECOND QUARTERLY DIVIDEND.

FURTHER proof of Independent progress in Utah is shown by the second quarterly dividend of one per cent. which has been declared by the Utah Independent Telephone Company. The first dividend was declared last January, one year after the company started business. Since then the system has been greatly extended, several new exchanges having been placed in operation and an extensive system of toll lines has been built.

It is interesting to note that the majority of the stockholders are residents of Utah, many being identified with the business interests of Salt Lake City.

OBITUARY.

THE sudden death of Henry E. Hawley, general manager of the Hudson River Telephone Company, was a severe shock to the men connected with the interests which he has served for so long a time. Mr. Hawley was born in Troy, N. Y., August 16, 1861. After completing his education and working in various lines of business not connected with telephone work, he became associated with the Hudson River Telephone Company. On January 1, 1892, he was advanced to the position of general manager, and he has held that office since then. He was a man with many interests and numerous social connections, and his loss is mourned by the many people with whom he has been associated.

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QUERIES

AUTOMATIC STARTING BOX.—(690.)

I should like to know why a starting box for motors which has to have its arm moved up a notch at a time by hand is called automatic. R. G.

You seem to be considering the matter from the wrong standpoint. It is true that the arm has to be moved across the coil terminals one at a time in order to gradually cut out the resistance which prevents a rush of heavy current through the armature at the time of starting. When full speed is attained, however, the arm is automatically held in place, and automatically released and returned to the starting position when the machine stops.

CABLING TO REPEATING COILS.—(691.)

Will you please explain how the cabling to repeating coils in the regular Bell cord circuit is arranged? R. N.

A single cable from the lugs in the rear of the switchboard carries wires for the tip and ring connections of both calling and answering divisions of each cord circuit to the repeating coils. The same cable also carries directly to the fuse board certain wires which provide a battery supply for various circuits in the switchboard; but these have nothing to do with the repeating coil wire. The arrangement of the repeating coil on the repeating coil rack, and the fuse board is shown in Fig. 691a. Although various methods of arrangement are in use, the one shown is a typical one, in which the wiring may be most readily traced. The wiring of the circuit and of the repeating coil itself is shown in Fig. 691b. It will be observed that there are four windings in the repeating coil. Two terminals are connected to the tip and ring of the answering cord respectively, and two to the tip and ring of the calling cord. There are two sets, of two terminals each, strapped together, and to each of these straps is connected one pole of the storage battery. The positive side

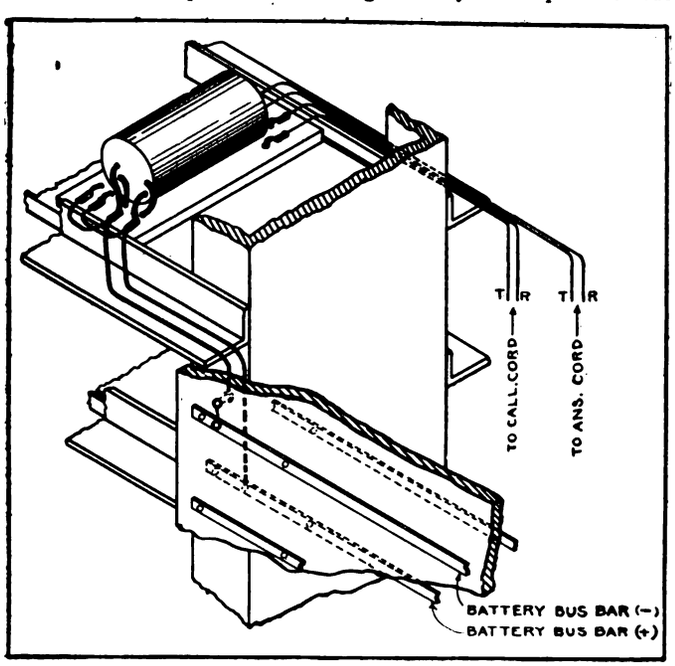

Fig. 691a.

is connected without the interposition of a fuse, while the negative side is fused. On the right of the figure is shown the arrangement of lugs on the repeating coil base, with connections brought out from the winding, and the wires to battery, as well as to switchboard cord strands indicated by letters. T and R represent the tip and ring strands of the calling cord, and T_1 and R_1 represent the tip and ring strands of the answering cord. These four wires are those which are carried directly to the switchboard, while the wires marked B— and B+ are carried directly to the fuse board. The method in which these wires are run in cable is indicated in Fig. 691a.

While this figure shows one set of cabling on the front and the other on the back of the repeating coil rack, another arrange-

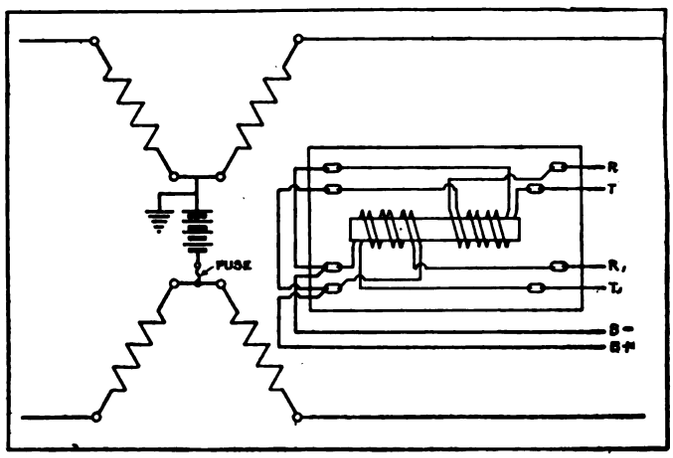

Fig. 691b.

ment is frequently used. In the second plan all lugs on the wooden base to which the repeating coil is attached are mounted at one end. Connections are brought out according to the same scheme of wiring, and the wires to the switchboard are connected to the proper lugs. In making up cable, however, it is customary to make an individual or jumper cable, for carrying the wires from the fuse board to repeating coils, and lay it in place. The cable from the switchboard to repeating coils is then formed with the wires which go beyond the repeating coil rack to the fuse board, and are used for various purposes as mentioned above left long enough to reach beyond the rack to their proper locations. This cable is also laid in place beside the first one, and by some installers the two are tied together in such a way as to have the effect of a single cable. It is possible that if you have had difficulty in tracing out the wiring it is due to the fact that a separate cable has been tied into the regular switchboard cable in such a way as to conceal the fact that the short wires between the fuse board and repeating coils have been run in.

STRAIGHT GROUND WIRES.—(692.)

Will you please explain if there are any electrical reasons for making a ground wire from substation protectors as short and straight as possible? G. J.

A ground wire should be as short and straight as possible in order to secure the most efficient protection against lightning. It is more important that it should be straight than that the length should be small. The reason for this is that a lightning discharge is oscillatory in character, and the direction of the discharge is reversed at such an extremely rapid rate that a bend or partial loop of the wire has extremely high inductance. This being the case its impedance, or effective resistance, to the passage of the current resulting from the lightning is excessively high, in fact much higher than that of a straight air gap. It is owing to this that when the discharge encounters such a high resistance path it will seek a line of less resistance for its passage to earth, and will jump the air space to the nearest ground connection. In doing so it is liable to take a course which will do considerable damage. A straight ground wire has the minimum inductance, and therefore offers the least resistance to the passage of the discharge.

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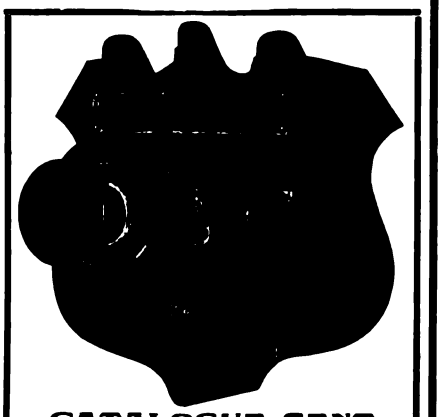
975 Different Telephone Co.'s Now Use Them

You Simply Drop the Coin

GRAY TEL. PAY STA. CO. HARTFORD, CONN.



CATALOGUE SENT

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE, CHEAP—600 pairs self-soldering protectors. Also one 300 pair and one 500 pair main distributing frame, used less than two months. Will sell separately or together. Address Virden Telephone Exchange, Virden, Ill., or Girard Telephone Exchange, Girard, Ill. 420

FOR SALE—A 225 telephone exchange located in a good business town in a rich agricultural district in Illinois. Good paying property and growing rapidly. Price $4,500. Address Box 598, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 598

FOR SALE CHEAP—Complete one hundred line magneto express Fisk-Newhall switchboard, brand new, never been used. Delivery can be made at once from our Fort Worth warehouse. Will furnish complete, or partly installed as desired. Address Wesco Supply Co., St. Louis, Mo. 608

FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

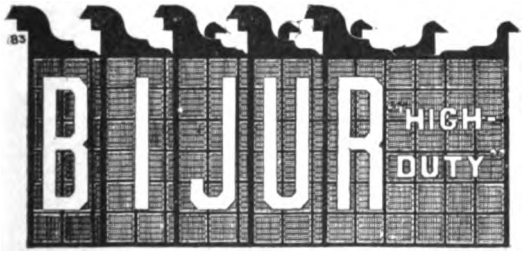
WANTED—At once, two first-class Independent solicitors for work in Missouri. Salary at beginning depends upon references. Address Box 409, St. Joseph, Mo. 602

WANTED—Position as manager. Can furnish best of references. Am at present manager of an exchange of 1,000 subscribers. Would take some stock. Address, Box 609, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 609

THE FOUNDATION of our business lies in the fact that we are successful in placing men speedily and satisfactorily. Our trained experts know just which men to select for each particular position. Investigate to-day the advantages and facilities we offer. Hapgoods, suite 511, 309 Broadway, New York City. 464

WANTED—Position wanted by an all round telephone construction man who is thoroughly competent, sober and reliable. Best of references. Have completed course in telephone engineering. Address Box 587, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 587

WANTED—Position as manager in exchange of 1,000 subscribers or less. Have had five years' experience in telephone business and am graduate of International Correspondence Schools. Best of references. Address Box 597, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 597



Plates consist of multicellular units of pure lead, welded to strong alloy frames. The active portions of both positive and negative plates are electrochemically formed, and so disposed with respect to the grid that perfect provision for expansion is obtained, **ELIMINATING THE POSSIBILITY OF BUCKLED PLATES.** The pure lead grills are open structures, having no center web, giving a **THROUGH AND THROUGH CIRCULATION** of electrolyte and maintaining perfect acid diffusion, resulting in low charging voltage and constant E. M. F. on discharge.

GENERAL STORAGE BATTERY CO.

GENERAL OFFICES: 42 BROADWAY, N. Y. **WORKS: BOONTON, N. J.**

BOSTON CHICAGO CLEVELAND SAN FRANCISCO WASHINGTON, D. C. MEXICO CITY

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TELEPHONE PATENTS

PROTECTIVE APPARATUS.

Frank B. Cook, Chicago, Ill., patents (No. 815,406; dated March 20, 1906; filed April 27, 1905; serial No. 257,669) an automatic electrical self-soldering reset for thermal protectors.

The object of this invention is to provide a means whereby thermal protective apparatus may be automatically tested and reset after it has operated. This the inventor accomplishes by means of a tool in conjunction with a thermal operating device of a special design. Referring to the accompanying illustrations *a*

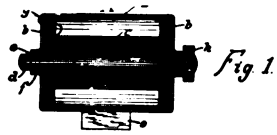


Fig. 1.

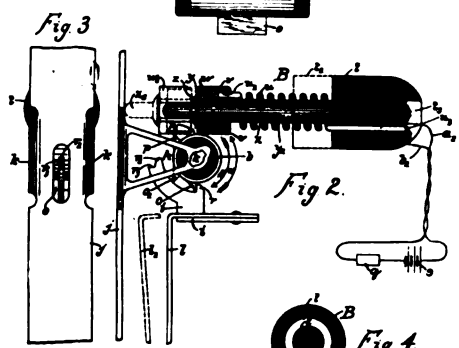


Fig. 3.

Fig. 2.

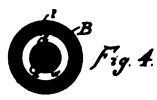


Fig. 4.

is a heat coil provided with a pin *d* secured to the tube *f* by an easily fusible solder. The heat producing winding is connected to the pin *d* and shell *a*. Attached to the shell are two teeth *o*, *p*. In its operative position the device *a* is held between ears *k k* of spring *j*, the flattened end *h* fitting into an indenture in one of the ears to hold the pin *d* in a fixed position. The spring *l* by means of the point *r* engages the tooth *o* and tends to turn the heat coil in the direction *m*.

The circuit of the apparatus is from spring *j* through ears *k*, *k*, pin *d*, tube *f*, winding *c*, shell *a*, tooth *o*, point *r*, to spring *l*. When an excessive current passes through the coil for a sufficient length of time the solder *e* is softened and the coil is turned under the tension of the spring *l* acting upon the tooth *o*. The new position of the coil is with tooth *o* at point o_2, tooth *p* at point p_2 and spring *i* disengaged from the coil as at l_2 leaving the circuit open. As soon as the solder *e* cools the tube *f* is resoldered to the pin *d* in this new relative position.

The resetting tool *b* consists of a pin *x* provided with an annular shoulder *z* and extends through an insulating sleeve y_2. An insulating washer *y* separates the shoulder *z* from the plunger *w*. A spiral spring *u* is placed on sleeve y_2 and conductively secured to the plunger *w*, one end passing through the insulating handle *t*. A battery circuit including a buzzer or other signaling device *q* is attached to the terminals of the spring and pin. To reset the coil the plunger *w* is placed against the tooth *p* in position p_2 and pressure is exerted upon the handle *t*. This causes the pin *x* to make contact with the spring *j* as at x_2. A circuit is then formed from the battery *s*, pin *x*, spring *j*, ears *k*, *k*, pin *d*, coil *c*, shell *a*, tooth *p*, plunger *w*, spring *u*, device *q*, back to battery. When the current from battery *s* has traversed the coil *c* long enough to soften the solder, the heat coil revolves upon the pin *d* in direction *n*, due to the tension exerted upon it by the spring *u* acting upon the plunger *w*. When the plunger *w* passes the point of contact with the tooth *p* the circuit is broken and the solder cools, leaving the coil in its original position. The point *r* of spring *l* may now be engaged with tooth *o* and the coil is ready for another operation.

TELEPHONE EXCHANGE.

Benno Salzmann, Berlin, Germany, patents (No. 815,042, dated March 13, 1906; filed November 16, 1905; serial No. 287,723) a telephone exchange system.

This patent relates to that class of systems which require the services of two operators for the completion of a call, one a distribution operator and the other a connecting operator. Its essential features consist in the employment of signals whereby a distributing operator is informed when the connecting operator with whom she wishes to co-operate is busy.

TRANSFER CIRCUIT.

Charles A. Simpson, Chicago, Ill., patents (No. 816,131; dated March 27, 1906; filed October 27, 1904; serial No. 230,206) and assigns to the Kellogg Switchboard and Supply Company, of Chicago, Ill., a transfer circuit.

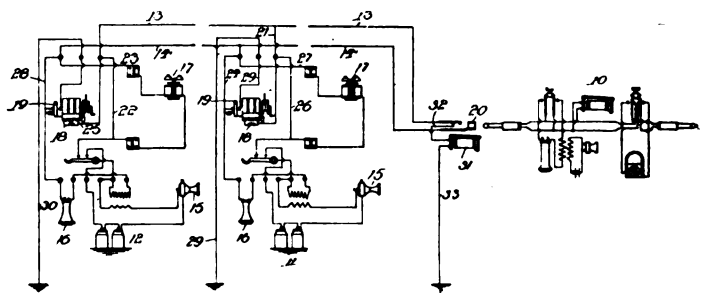
The object of this invention is to provide an improved transfer system of connections between subscribers' jacks located at different switchboard sections, which will facilitate the work of the operators in connecting and disconnecting the lines. The inventor claims that this circuit is suitable for use between two magneto positions, two magneto lamp positions, or between one magneto and one magneto lamp position, or between a common battery position and either of the above.

As it is impossible to completely describe the features of this patent in the space at our disposal we would suggest that parties interested procure a copy.

TELEPHONE SYSTEM.

Louis W. Carroll, Anamosa, Ia., patents (No. 814,830; dated March 13, 1906; filed March 24, 1903; serial No. 149,265) a telephone system.

This patent discloses means whereby persons on a party wire can signal each other without calling the exchange and vice versa. To accomplish this result a spring controlled switch 19 is installed at each instrument and so connected as to normally bridge the generator across the line. An alternative contact is provided which connects to ground and the drop at the exchange is



grounded. To signal a party on the same line the generator is operated and current passes over the line wires 13-14 to the bells of the different stations, but the drop is not actuated. If it is desired to call the operator, switch 19 is moved over to make connection with the ground contact and a circuit is completed over line wire 13, drop 31 and ground connections 33 and 30. The generator now being operated, the call is received at the exchange and the bells at the substations remain silent.

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We manufacture everything necessary in the Stationery Line for New or Old Companies. We can equip your office with a system especially designed to meet the requirements of Telephone Finances and Accounting. No loopholes are left for money leaks.

If you need Incorporation Records, By-Laws, Stock Certificates, Bonds, Lease Ledgers, Branch Exchange Reports, Toll Tickets, Filing Cabinets, etc., we have them.

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We have designed and copyrighted forms which reduce the labor of bookkeeping to a minimum. They detect and stop the leaks.

You had better let us tell you more about our telephone Systematizing department. Just write for particulars and catalogue.

THE Edwards-Hine Co.

Telephone Systems Department

5-7 Pearl St., Grand Rapids, Mich., U. S. A.

BATTERY TROUBLE IN A TELEPHONE—

Like the notorious straw that broke the camel's back, is a little thing by itself, but it kills and renders useless the whole system.

And it is just one's luck for the break down to come at an important moment when delay is costly.

The "1900" dry battery is "tailor-made" to ring bells—telephone and door. It is as near perfection as it is possible to make it. It is inspected at every stage of its making.

The "1900" represents 18 years of dry battery experiment and experience.

Stromberg-Carlson Telephone Mfg. Co.

ROCHESTER, N. Y.

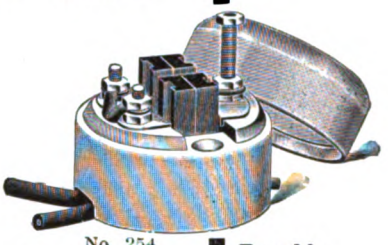
General Offices, Rochester, N. Y.

Branch Sales Office, Chicago, Ill.

PROTECTION 90%

Which Side Are You On?

90% of the Exchanges use protection on their phones and have 10% or less trouble.



No. 254 Carbons only.

No Protection 10%

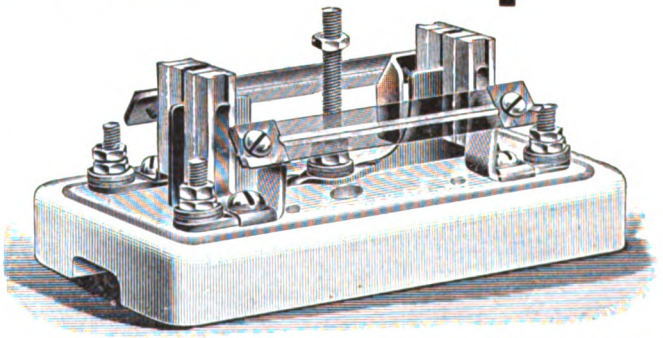
Trouble 90%

10% of the Exchanges use no protection and have 90% or more trouble.

No. 253 Carbon and Fuse.

Buy Sterling Protection

We Can Reduce Your Troubles With Our Protectors



No. 252 Double Carbon and Extra Long Fuse.

Get on the Right Side

Sterling Electric Company

Lafayette Ind.

STERLING

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SHIELD EMBLEMS.

IN order that all telephone companies may have the national Independent emblem in a convenient form for use upon their stationery, and for general advertising, the Edwards-Hine Company, 5-7 Pearl street, Grand Rapids, Mich., has arranged to issue a set of gummed national emblem stamps, which can be used in many different ways in an effective manner and at slight expense. These stamps are printed in two different styles, and in two separate sizes for each style. They are well gummed, and can be affixed not only to stationery, but to glass or wood work, and will stay put for weeks and months at a time.

For general advertising purposes they may be used for toll booth doors, instruments and signs. They are also suitable for telephone number cards to hang beside the telephone and for directories. By their use in this manner every piece of the telephone company's property which comes directly under the observation of subscribers or telephone users conveys all the benefits derived from the advertising value of this national emblem. If they are wisely and neatly placed the attractive features of the emblem make it a desirable ornament.

A box of stamps can be kept on the desk of the persons who forward mail, and used to attach to papers of different kinds which do not bear the printed shield. This would apply to contracts, bills, receipts, etc., and also to sealing envelopes.

The especial advantage in the use of these stamps for directories comes from the fact that many small exchanges have their books printed by local printers who are unable to do good two color work. In a very short time these stamps can be attached by the use of a sponge to a considerable issue, and very satisfactory results secured at a low cost. For decorating toll booths and telephone instruments this stamp furnishes a sure means of indicating an Independent instrument to all who are familiar with the emblem, and the manager who uses them need never fear that a Bell booth will be used through ignorance. "Look for the Shield" is now the recognized battle cry of the Independents, and people are beginning to look for the emblem whenever they wish to use a telephone. Every manager should get in line as soon as possible, and these stamps offer an economical and convenient method of securing the emblem for use in a great variety of ways. The company states that its prices upon quantities have been placed so low that any telephone company can afford to use them freely. It will be pleased to send further information and prices to all inquirers.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, N. Y., is manufacturing a large common battery multiple lamp signal central office equipment for the Hornellsville Telephone Company, of Hornellsville, N. Y., and a similar equipment is also being manufactured for the Cortland County Telephone Company, of Cortland, N. Y. It is also completing the installation of common battery equipment of the lamp signal type for the Citizens' Telephone Company, of Bath, N. Y., and also for the Lancaster Telephone Company, of Lancaster, N. Y. Both of these equipments include a Century 4-party selective system.

SAN FRANCISCO CALLS FOR MEN TO REBUILD THE CITY.

IN response to the appeal of Mayor Schmitz of San Francisco for architects, draughtsmen and superintendents of building construction to assist in rebuilding the city, Hapgoods, the national organization of employment experts, has offered its services without charge either to employer or employee, and will work in close co-operation with the city authorities in finding suitable men to go there immediately. Immediately after the Mayor's appeal was received, Mr. H. J. Hapgood, president of Hapgoods, issued instructions to the twelve offices of the company throughout the country to institute a special search for the kind of men desired, and within a few hours lists of the names and addresses of a large number of experienced men who are available were telegraphed to San Francisco.

The number of men who have thus far signified their willingness to go to the stricken city is not large enough to meet the enormous demand which has been created by the announcement that the city will be at once rebuilt, and that within a few days over $20,000,000 worth of contracts will be awarded. Hapgoods has placed its services at the disposal of the people of San Francisco, and will be glad to hear at once from every competent architect, draughtsman or construction superintendent in this city or vicinity who would be willing to go to the coast. Full details concerning the opportunities offered will be supplied as soon as they are received from the San Francisco authorities, and as stated above, there will be absolutely no charge to either employer or employee.

NEW MODEL FIELD TELEPHONES FOR THE U. S. SIGNAL CORPS.

THE accompanying illustrations show a modern type of field telephones which the U. S. Signal Corps has recently adopted. The first order for 500 of these instruments shown in Fig. 2 was filled by the Dean Electric Company, Elyria, Ohio.

In designing a new type of telephone for field service, the Signal

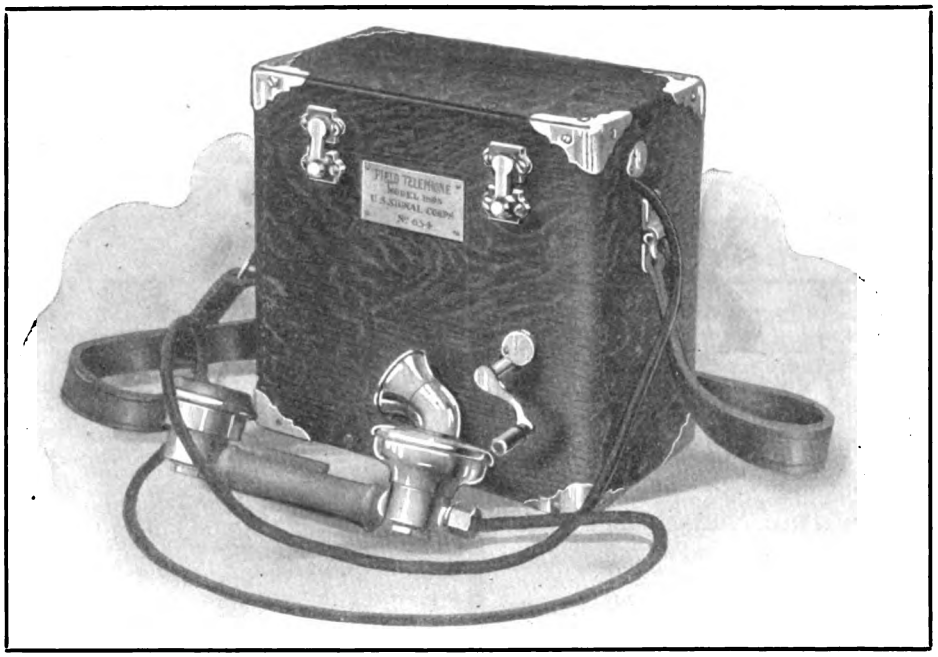

Fig. 1. New model field telephone designed for the U. S. Signal Corps by the Dean Electric Co.

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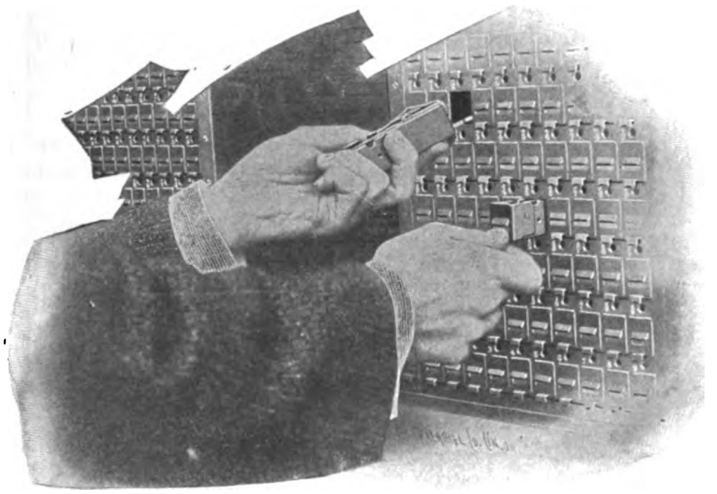
THE UNITYPE

Pat. April 25th, 1905

The hands are all the tools you need to insert or remove a drop from THE UNITYPE SWITCHBOARD.



Hands Removing Drop from Switchboard.

Let us tell you more about the Complete Switchboard

Hands Removing Coil from Drop.

Every part is as easily disassembled as this one. Loosen one screw and remove coil without changing adjustment in any manner.

One Minute's Time to Fix It!

THE SUMTER TELEPHONE MFG. CO. Sumter, S. C.

Sandwich Pole Changer Company
400 Eddy St., Sandwich, Ills.

Do You Get Our Rings? If not write for Prices and Catalogues of our

Pole Changers
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Guaranteed to you.

DUPLEXERS

That Will DUPLEX
THE ILLINOIS AND SANDWICH DUPLEXERS

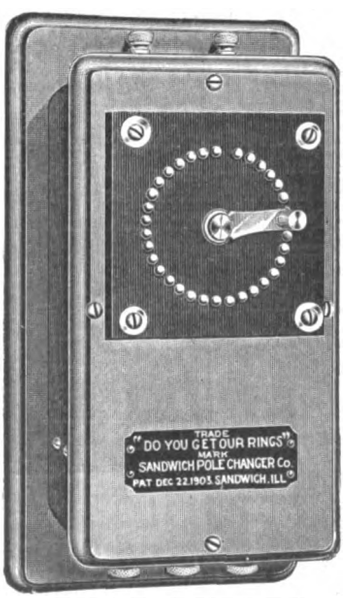
Let us make

3 Metallic Circuits Out of 2 Circuits

for you. You can divide your Metallic Circuits. You can give an Independent Circuit to one or more subscribers.

You Can

Increase Your Toll Lines 100 per cent.



THAT DUPLEX

These Duplexers are provided with a very simple but efficient

Balancing Device

A child can balance your lines instantly with this switch after your Duplexers are once installed.

You need not buy before being convinced of their true value We send our instruments on 30 DAYS' FREE TRIAL So you may know how much TIME and money they will SAVE you. Write and let us know your needs. We can do you a great amount of good for a small outlay of money.

SANDWICH POLE CHANGER COMPANY, 400 Eddy St., Sandwich, Ills.

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Corps demanded great efficiency in transmission, durability, compactness and ability to withstand all conditions of weather. Fig. 1 shows one of these telephones with the micro-telephone in the foreground and the generator crank inserted ready for service. The micro-telephone set is made exceptionally heavy and strong. The handle is cast aluminum, while the receiver and transmitter casings are of finished cast brass. This hand set is provided with soft rubber gaskets at all of the joints and soft rubber diaphragms in the transmitter and in the hand switch opening. so as to make the interior mechanism moisture and water proof. The transmitter itself is of the very efficient standard Dean construction, and is admirably adapted to this kind of service.

The case of this telephone is made from the best quality of quarter sawed oak, substantially put together and finished with hand rubbed varnish. The box is not only dove-tailed together, but is re-enforced by heavy wood screws and metal corners, while the lid is swung on three long hinges, the lid being held closed by two metal clasps. A long reenforced shoulder strap is provided for carrying the instrument. Besides the micro telephone this field telephone contains an induction coil, ringer and generator and a space for cells of 2½" x 7" dry batteries. All of this apparatus is located in the bottom part of the set in compartments so that the extreme upper portion of the box is available for holding the micro telephone when not in use. The generator crank is also accommodated in this upper compartment. Several metal covers are used to close the line wire, cord and crank opening, so that when the telephone is ready for transporting the interior is completely protected.

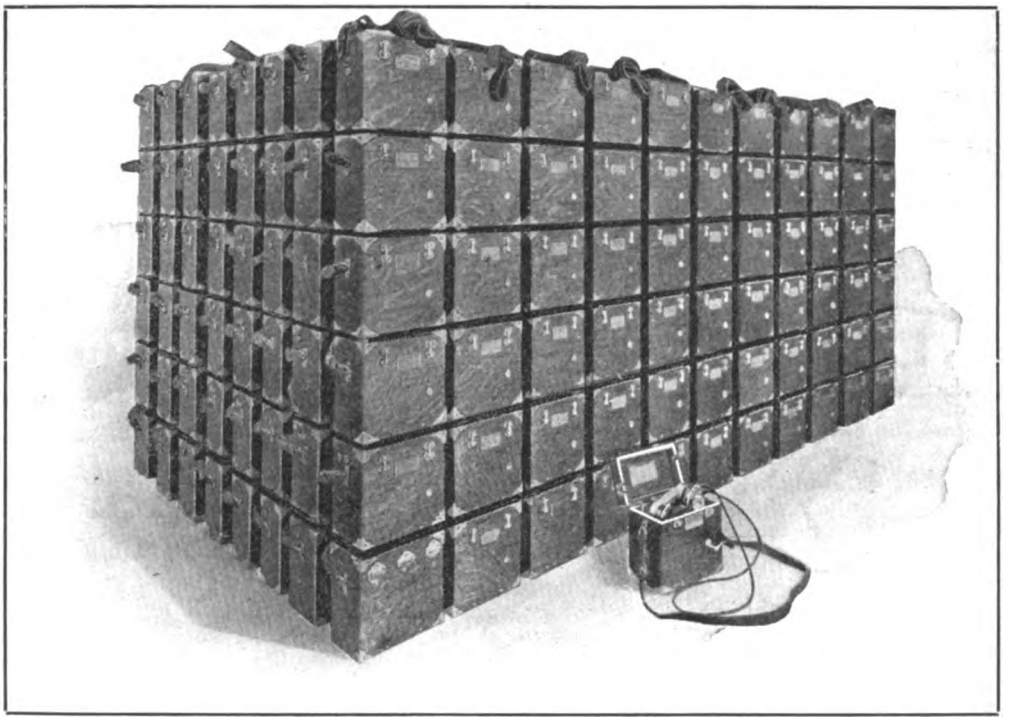

Fig. 2. Group of 500 field telephones, shipped as the first order by the Dean Electric Co.

All of the interior partitions of the telephone set are removable so each of the parts can be readily removed and inspected without disconnecting the wiring. The wiring is done with a special flexible conductor made from fine stranded copper wires and insulated with pure soft rubber and an outer braid. The flexible cord which extends to the micro telephone set is made from similar conductors with an outside covering of pure soft rubber and a braid.

The armature of the generator is treated with a special insulating varnish so as to be thoroughly moisture proof; the windings of the receiver, induction coil and ringer are similarly treated for the same purpose.

The ringer is self-contained, not depending on the woodwork for the adjustment of any of its parts. All metal parts, excepting those required for magnetic circuits, are made from non-corrosive material and finished with heavy nickel plate.

This new model field telephone is in complete keeping with the latest advances in telephone design, and is one of the many indications of the progressiveness of our government officials. The Dean Electric Company has also recently supplied the U. S. Signal Corps with some of its standard magneto telephones. One order called for 150 of the Dean bridging wall telephones housed in the popular common battery type cabinet known as the No. 1420 type instrument. The same order also included 50 standard Dean desk telephones.

PATENTS ON PROTECTIVE DEVICES.

IN our advertising columns appears copy of a document relating to the patents of Frank B. Cook. Mr. Cook claims that he owns and controls absolutely without a cloud on his title a large number of important patents on various protective devices. Among the thirty-four enumerated in the list are patents covering such well known types of Cook apparatus as No. 4, No. 44, No. 444, No. 8, No. 10, No. 14, and No. B-4 protectors, including test plugs, terminal transposition, or cross-over, sectional mounting plates, and numerous other detail patents.

An important patent which was issued only April 3, 1906, covers the new inventions which have been embodied in Cook's Type L iron frame distributing board.

Another very important patent was issued March 20th, 1906 This patent covers broadly the No. 10 protectors, which is Mr. Cook's latest improvement and is the type selected by the Kinloch Telephone Company of St. Louis for its new exchange which requires 15,756 pairs of protectors in the main exchange alone.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., reports increasing sales for its wood preserving preparation, Avenarius Carbolineum. This material has been on the market for a number of years and the manufacturers claim has never been equalled for prolonging the life of timber exposed to the elements. It is easily applied by means of a brush and is found to be far superior to ordinary paint for protecting pole roofs, gains, cross-arms and the butts of poles where the greatest liability to decay occurs. Numerous practical tests have been made by users of this material in all parts of the country, and booklets giving the experience and testimony of many of the largest telephone, railroad and telegraph companies in the country will be sent to all interested parties upon request.

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World's Best Battery

Here's the trademark. It *means* a whole lot. On the

Rock Island New Patent Dry Cell

it's a warranty deed for more lasting worth than is loaded into *any other* dry battery. Every battery is *made by hand.* This mode of careful construction *insures* superiority. Competitive and exhaustive tests have proved that the Rock Island has 20 to 30 per cent. *greater efficiency* and

20 to 30 Per Cent. Longer Life Than Others

Our Standard No. 6 is the regular size most generally used for all purposes.

Our Standard No. 8 is 3½ by 8 inches and it is the battery that has won highest endorsement from leading Telephone Manufacturers and Telephone Companies. They find it just the sort of battery needed for their *best* work —*the* battery for reliably long service. Higher at first cost, it is *cheaper* in the long run.

Write Department D for prices.

ROCK ISLAND BATTERY CO.
Ninth and Sycamore Streets **Cincinnati, O.**

TELEPHONY

offers to young men a career full of splendid possibilities. If you desire to fit yourself for a responsible and well-paid position, fill out this coupon to-day, requesting our 200-page handbook (FREE), describing our Telephone, Electrical, Mechanical Engineering Courses and over 60 others. This is **your** opportunity. Take advantage of it. Write NOW.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, ILL.

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BE AS HONEST

with yourself as we are in the manufacture of *International* Apparatus. Give us the opportunity of estimating on your next order for telephones or switchboards. Recent installations in the U. S. and Foreign Countries are convincing.

International Telephone Mfg. Co.
HARRISON AND CLINTON STS.
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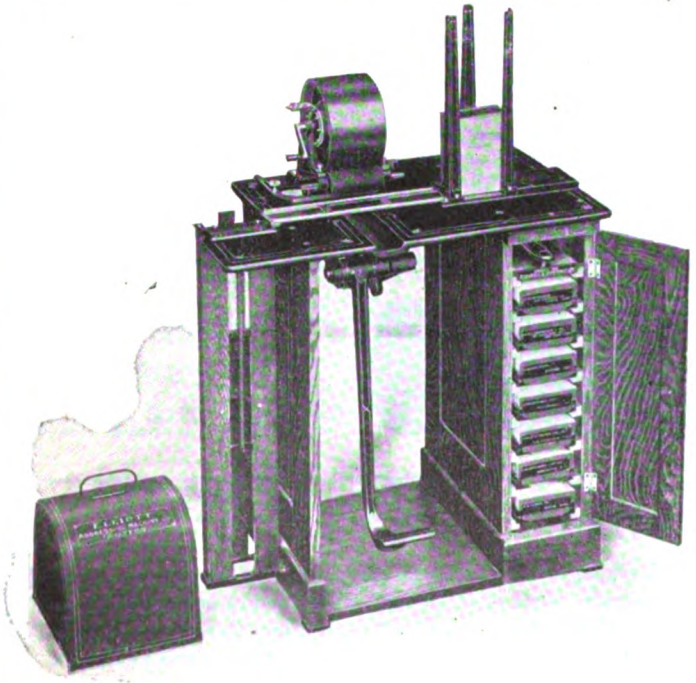
CARD INDEX CLASSIFICATION

AND SUBDIVISION WITH THE **ELLIOTT ADDRESSING SYSTEM**



By Stencil Frame and Guide Card, in Tray and Cabinet, make Changes and Additions a matter of Ordinary Office Routine.

One-Half Cent Per Address

Or Less, is the Cost with the use of the Office Stencil Cutter. Sample Sheet of Stub Bill Work shows Clearness and Legibility with Data.

ELLIOTT ADDRESSING MACHINE COMPANY

101 Purchase Street **Boston, Mass.**

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THE WEEK'S MESSAGES

FINANCIAL.

FT. WAYNE, IND.—The Home Telephone Company, of Ft. Wayne, Ind., has declared a semi-annual dividend of 1½ per cent. on its capital stock.

SOUTH BEND, IND.—The South Bend Telephone Company, South Bend, Ind., has declared a semi-annual dividend of 1 per cent.

CLEVELAND, O.—The Cuyahoga Telephone Company has decided to pay a 4 per cent. dividend, payable May 1.

SALT LAKE CITY, UTAH.—A second dividend of 1 per cent. on the capital stock of $1,000,000 has been declared by the Utah Independent Telephone Company.

WHEELING, WEST VA.—The National Telephone Company has declared a 6 per cent. dividend out of the earnings of the company during the past twelve months. This is the third annual dividend declared by the company.

FRANCHISES.

MARSEILLES, ILL.—The Marseilles Telephone Company has been granted a franchise at Marseilles. The company is to make many improvements in its system at that city.

WARE, MASS.—The Citizens' Independent Telephone Company of Northampton is to apply for a telephone franchise at Ware.

HILLSBORO, TEXAS.—The Independent Telephone Company has applied to the City Council of Hillsboro for a franchise to establish a telephone exchange at that city.

CHARLOTTETOWN, P. E. I.—The franchise of the Island Telephone Company has been extended ten years. The company now proposes to expend $20,000 in improving its system.

COMBINATIONS.

BUFFALO, N. Y.—The Inter-Ocean Telephone Company has acquired the Phelps Telephone Company. The Inter-Ocean Company will enlarge the system and connect it with its trunk lines.

SNYDER, OKLA.—The Snyder Telephone Company has purchased the property of the Topeka and El Reno Telephone Company in the town of Snyder.

FAIRMONT, W. VA.—The Consolidated Telephone Company, which controls all the Independent lines in northern West Virginia, has become the owner of the Parsons Telephone Company.

ELECTIONS.

SALEM, ILL.—The Woodlawn Telephone Company has elected the following officers: N. Howe, president; Ora Bradley, vice-president; Emmus Loefel, secretary; Luther Howe, treasurer; A. L. Waring, Ora Bradley and Charles Swalley, directors.

FALL RIVER, MASS.—The Fall River Automatic Telephone Company has elected the following officers: Clerk and treasurer, Bradford D. Davol; directors, Edward B. Jennings, Edmund W. Wakelee, John T. Swift, P. A. Mathewson, Joseph Watters, Martin Feeney and Bradford D. Davol.

WARWICK, N. Y.—The Warwick Valley Telephone Company has elected the following trustees: John W. Sanford, Fred C. Carey and George F. Ketchum.

ALPENA, MICH.—The Alpena Mutual Benefit Telephone Company has elected the following officers: President, C. H. Reynolds; secretary and treasurer, W. H. Johnson.

ALLIANCE, O.—The Sandy Valley Telephone & Electric Company has elected the following officers: R. S. Kayler, president; A. S. Hillhouse, Canton, vice president; F. D. Miller, secretary and treasurer; M. W. Welker, of Canton, auditor, and Martin Morton Perdue, of Canton, general manager.

ORWELL, PA.—The Orwell Telephone Company has elected the following directors: E. D. Chaffee, N. A. Chaffee, H. G. Newell, J. E. Eastman and C. H. Allis.

NEW COMPANIES.

ADAMS, ILL.—The West Union Telephone Company, Adams, has been incorporated with a capital stock of $9,000. The incorporators are P. J. Doge, E. Ahlers and F. J. Grubb.

CHADWICK, ILL.—The Mutual Telephone Company has been organized at Chadwick. James Taylor is president of the company.

EAST ST. LOUIS, ILL.—The Dupue Telephone Company, of East St. Louis, has been incorporated with a capital stock of $10,000. Incorporators are Levis Beauman, I. O. Whitnel and W. H. Garlan.

LENZBURG, ILL.—The Risdon Telephone Company, Lenzburg, has been incorporated with a capital stock of $500. Incorporators are Henry Kirchoefer, Henry Gruenewald and Fred W. Wasem.

MILLSTADT, ILL.—The St. Clair Farmers' Mutual Telephone Company, Millstadt, has been incorporated with a capital stock of $2,000. The incorporators are Richard Rohr, Daniel A. Haas and Conrad Keck.

JEFFERSONVILLE, IND.—The Jeffersonville Home Telephone Company has been organized with a capital stock of $10,000. The incorporators are Jacob Eberts, Froman Coots, Floyd Parks, William Varble and Albert E. White. The company will install and operate exchanges within the county of Clark and State of Indiana.

PENDLETON, IND.—The Citizens' Mutual Telephone Company, of Madison and Hancock counties, has been incorporated with a capital stock of $2,500. The incorporators are William Rogers, John Henry, William Franklin, Clavin F. Davis and Flavius Pritchard.

ROME, IA.—An Independent Telephone Company has been organized at Rome. The company will establish an exchange in the postoffice, and will build lines to Glasgow, Lockridge and other points.

EDMOND, KAS.—The Edmond Mutual Telephone Association has been incorporated with a capital stock of $5,000.

BELT, MONT.—The Belt Valley Telephone Company, Belt, Montana, has been incorporated with a capital stock of $25,000. The incorporators are C. E. K. Vidal, J. K. Castner and A. P. McAnelly, all of Belt.

WILBER, NEB.—The Wilber Telephone Company has been incorporated with a capital stock of $2,820. The company will build lines in Wayne and Dixon Counties.

SARGENT, NEB.—The Sargent Independent Telephone Company has been incorporated with a capital stock of $4,900. The incorporators are J. R. Sutton and others.

IREDELL, N. C.—The Iredell Telephone Company has been organized. Those interested in the new project are R. V. Brawley, H. P. Grier and Eugene Morrison.

JERUSALEM, N. Y.—The Lake Valley Telephone Company has been incorporated with a capital stock of $300.00. The incorporators are William H. Van Nalton, Edward L. Mitchell, Alton C. Mosher, Jerusalem, N. Y.

WAKEMAN, O.—The Todd Corners Telephone Company has been organized at Wakeman.

ALINE, OKLA.—The Aline Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are George W. Graham, of Chicago; H. A. Noah, of Alva; John Hartshorne, of Aline.

SENTINEL, OKLA.—The Sentinel Rural Telephone Company has been incorporated with a capital stock of $500. The directors are William Tidball, T. J. Bryan and I. M. Wright, all of Sentinel.

HOWARD, PA.—The Bald Eagle Telephone Company, Howard, has been incorporated with a capital stock of $15,000.

LONGSWAMP, PA.—An Independent Telephone Company has been formed at Longswamp. It will connect with the Mountain Line at Fredericksville, where an exchange will be established.

BRITTON, S. D.—The Social Telephone Company is being formed by the Commercial Club of Britton, S. D.

VERGENNES, VT.—The citizens of Vergennes, in public committee,

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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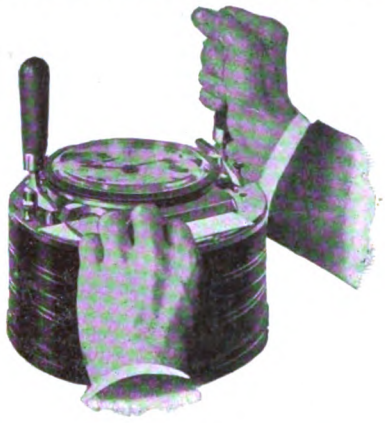

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is a mechanical time keeper which enables you to get full value for your toll service. By the simple movement of two handles, one when a conversation starts, the other when it is finished, you secure a printed record of the elapsed time in minutes and quarter minutes upon which to base the charge.

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The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

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THE WEEK'S MESSAGES

have voted to establish a municipal telephone system. Committees have been appointed to obtain cost of construction, etc.

GREENBRIER, W. VA.—The Greenbrier Mutual Telephone Company has been organized at Greenbrier. C. G. Rader is president and Thomas W. Shields, secretary and treasurer.

ATTICA, WIS.—The Attica Mutual Telephone Company, Attica, Green County, Wis., has been incorporated with a capital stock of $10,000. The incorporators are Oliver S. Jones, Herbert E. Ludington and Chauncey T. Bartlett.

BEAVER, WIS.—The Unity Western Telephone Company, Beaver, has been incorporated with a capital stock of $650. The incorporators are George H. Stone and others.

HIGHLAND, WIS.—The Individual Telephone Company, Highland, Wis., has been incorporated with a capital stock of $800. Incorporators are John J. Yerke, Joseph Richter and J. F. Lohrs.

MUSCODA, WIS.—The Pulaski Telephone Company, Muscoda, has been incorporated with a capital stock of $800. The incorporators are H. Roseneau, A. C. Kroesche, Henry Schneider and Thomas Seifert.

PERSONAL.

H. H. BRATT, who for the past two years has been superintendent of the Davenport office of the Union Electric Telephone and Telegraph Company, has been made general superintendent of all the lines and exchanges of the company He will continue his headquarters in Davenport, Ia.

OWEN M. BURGESS, of Nashville, Ill., has been appointed district manager of the Central Union Telephone Company, with headquarters at Centralia. His district embraces all of Illinois south of Decatur, and is the largest in the State. Previous to his promotion Mr. Burgess was chief purchasing agent.

R. C. ALLEN, who has, during the past year, been wire chief for the Mississippi Valley Telephone Company at Burlington, Ia., has accepted the position of manager of the Jones County Telephone Company at Anamosa, Ia.

O. R. BARNES, formerly an engineer in the distribution division of the Bell Telephone Company of Philadelphia, and for eleven years with the various Bell Companies, is now in the employ of the Keystone Telephone Company of Philadelphia as an assistant engineer on distribution work.

D. E. CAMP, formerly of Perry, has been appointed manager of the Pioneer Telephone Company's exchange at Shawnee, Okla.

F. B. CLYDE, formerly manager of the Tyler office of the Southwestern Telephone and Telegraph Company at Tyler, Texas, has taken a position as manager of the business of the Independent Telephone Company at that place.

S. E. McKENNAN, of Springfield, has been appointed manager of the Bell exchange at Taylorville, Ill.

U. L. McLAUGHLIN, who has been managing the De Pere exchange of the Wisconsin Telephone Company, has been promoted to a position in the maintenance department at Oshkosh.

WM. L. McNERNEY has been appointed manager of the De Pere exchange of the Wisconsin Telephone Company.

F. L. MARTIN, formerly advertising manager for the Stromberg-Carlson Telephone Manufacturing Company, will hereafter be associated with the White's Class Advertising Company, Caxton Building, Chicago, Ill. Mr. Martin will continue to devote much time to telephone advertising, in which he has had a wide and valuable experience.

MISCELLANEOUS.

MORRISTOWN, IND.—The Ripley County Telephone Company has recently installed a new 100 drop switchboard.

CANTON, MO.—The directors of the Northeast Missouri Telephone Company have elected W. G. Stephens general manager. Mr. Stephens won this promotion through valuable work at La Grange, where he has had charge of the company's business for the past year.

KANSAS CITY, MO.—The Missouri Pacific Railway is installing a private telephone system on its line between St. Louis and this city. The line is for the transaction of official business.

ST. JOSEPH, MO.—R. S. Hamilton, of Morristown, Ind., is compiling a system of accounts for a trans-state toll line company. This is to be made up of various Independent companies who will turn their long distance business over to the toll line company. Interested persons may obtain information by writing to Mr. Hamilton, P. O. Box 409, St. Joseph.

COLUMBUS, O.—The Columbus Citizens' Telephone Company has installed lines to nearly the full capacity of its 8,000 line main switchboard. The company now operates over 11,000 telephones in Columbus and Franklin county.

New Construction in the Field

MOBILE, ALA.—The Home Telephone Company is to spend $350,000 in extending its system.

ALACHUA, FLA.—The Alachua Telephone Company is to extend its lines to Worthington Springs.

COLUMBUS, GA.—The Hamilton Telephone Company is building a number of farmers' lines.

MIDDLETOWN, IND.—The Middletown Telephone Company is to establish connections with Sulphur Springs, Cadiz and possibly Mechanicsburg.

ARDMORE, INDIAN TERRITORY.—The Chickasaw Telephone Company is to spend several thousand dollars in installing a new central energy exchange.

COLO, IA.—The Boone County Telephone Company is making many improvements in its system.

DECORAH, IOWA.—The Standard Telephone Company is to make extensive improvements in its exchange at Decorah, including the installation of a new switchboard.

HARTFORD, IA.—The Hawkeye Telephone Company is to extend its lines from Hartford to Carlisle.

SALINA, KANS.—The Salina Telephone Company is to make improvements and additions to its Kipp exchange.

SAVONA, N. Y.—The Savona, Hammondsport and Bath Telephone Company expects to build lines to Watkins and Dundee.

SCHUYLERVILLE, N. Y.—The Commercial Union Telephone Company is extending its lines in Schuylerville.

PINGREE, N. D.—The Pingree Telephone Company is making preparations for the extension of its lines.

BARLOW, KY.—An Independent telephone exchange has been established at Barlow, and exchanges will be established at Kevil, La Center and Bandana. All will be under the control of the Paducah Home Telephone Company at Paducah.

THREE RIVERS, MICH.—The Three Rivers Telephone Company is building a line to Parkville.

MANCHESTER, MINN.—The Manchester Farmers' Telephone Company is improving its system.

BLAIRSTOWN, N. J.—The West Jersey Toll Line, operating between Blairstown and Belvidere, which has been purchased by New York capitalists, is to be reconstructed.

LIBERTY, N. Y.—The Liberty Mutual Telephone Company is building a line from Liberty to Hoytville, Pa.

COLUMBUS, O.—The Columbus Citizens' Telephone Company is to establish an exchange at Linden Heights.

McARTHUR, O.—The McArthur Telephone Company is improving its system.

MORNING SUN, O.—The Morning Sun Telephone Company contemplates doubling the capacity of its system.

ORWELL, PA.—The Orwell Telephone Company is to establish long distance connections with the York State Independent Company.

PITTSTON, PA.—The Commonwealth Telephone Company, with connections at Harvey's Lake, Bernice and Meshoppen, is to build several new lines.

SCRANTON, PA.—The Consolidated Telephone Company is making extensive improvements in its system, at an expenditure of over $30,000.

WASHINGTON, PA.—The Washington Mutual Telephone Company is rebuilding its line in Warren County.

VERMILLION, S. D.—The Twilight Club of Vermillion is considering the proposition of putting in a local telephone system.

CLARKSVILLE, TENN.—The Clarksville Home Telephone Company is rebuilding its lines from Clarksville to Memphis. The company will rebuild its system at Erin, and install a new switchboard.

BELTON, TEXAS.—The Independent Telephone Company, of Belton, is to undertake some extensive improvements and additions to its system.

FREDERICKSBURG, TEX.—The Texas Telephone Company is extending its lines to Mecklinburg.

NEWVILLE, VA.—James Hargrave, of Newville, is constructing a line to connect with Petersburg.

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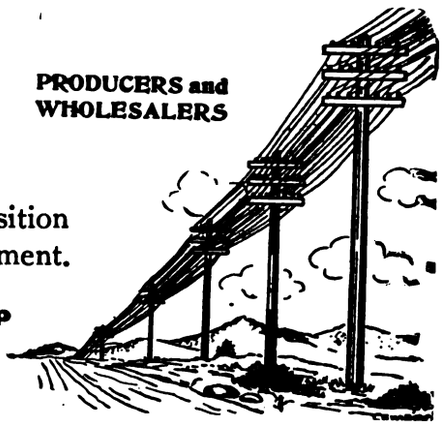

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16 to 25 ft.
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WHITE CEDAR POLES
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40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st
25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US
Yards { Omer, Bay City and Boyne Falls
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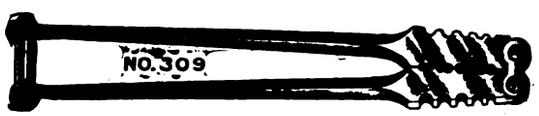

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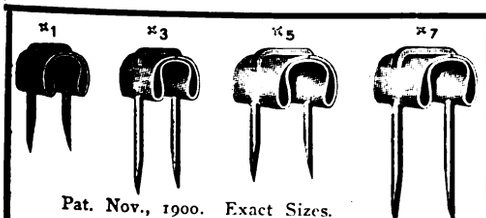

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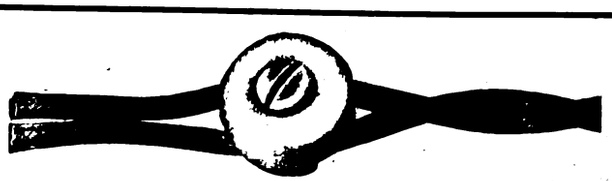

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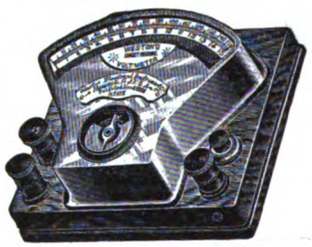
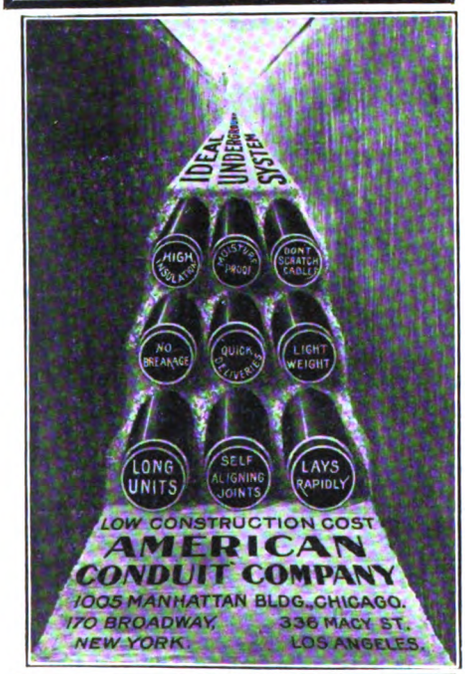
Berlin—European Weston Electrical Inst. Co., Ritterstrasse, No. 88.
New York Office—74 Cortlandt Street.



Weston Standard Portable Direct Reading Voltmeter.



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A SECRET CALLING DEVICE
Can be attached to any bridging generator.
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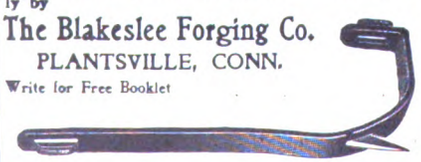

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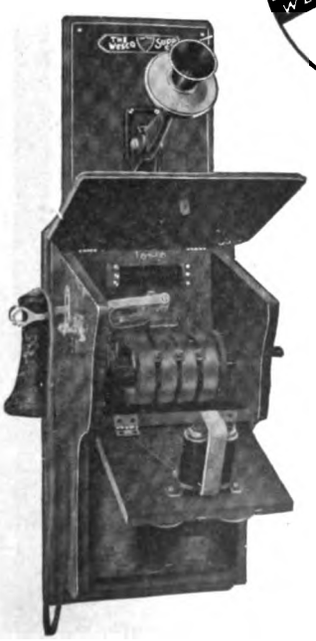

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"must bear a price in proportion to the skill, time, expense, and risk attending their invention and manufacture. Those things called dear are, when justly estimated, the cheapest; they are attended with much less profit to the artist than those things which everybody calls cheap. Beautiful forms and compositions are not made by chance, nor can they ever, in any material, be made at small expense. A composition for cheapness, and not for excellence of workmanship, is the most frequent and certain cause for the rapid decay and entire destruction of arts and manufactures."

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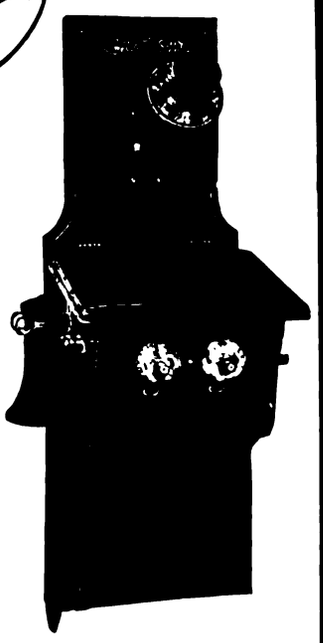

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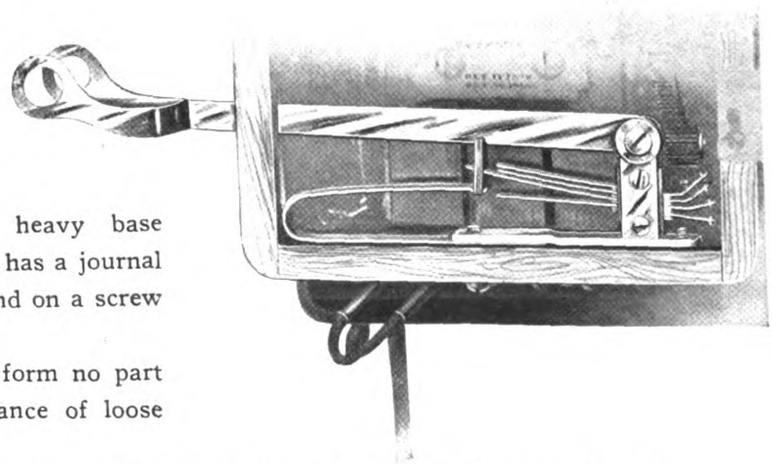
NORTH'S



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The lever, base and hinge form no part of the circuit—avoids all chance of loose contacts or accidental shocks.

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All contacts and terminals in plain view.

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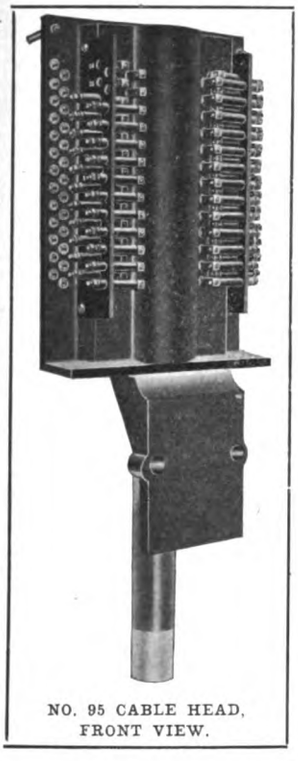

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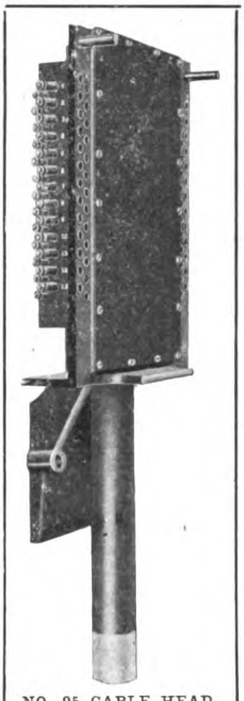

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And altogether it is the neatest, most compactly constructed cable head on the market, and all we ask is an opportunity to send you one.

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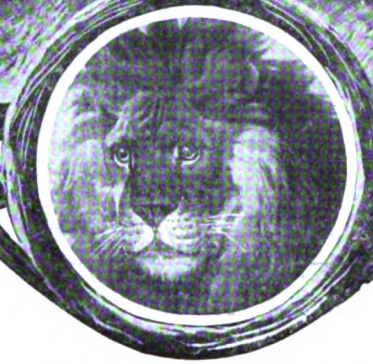
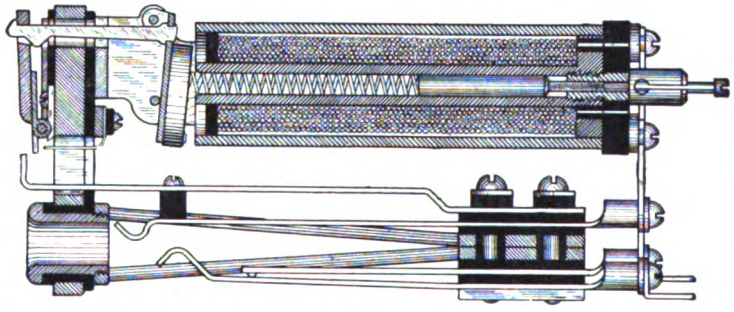
MONARCH



THE varying conditions of bridging lines make it necessary to have an adjustment on bridging drops if it is desired that a distinct signal be given the operator. On a short light line a drop receives a large amount of current and without some adjustment feature the armature will pull up and stick without giving a distinct buzz. The operator is then unable to determine whether the call is for central or for another subscriber on the same line unless she plugs in. In all Monarch bridging drops a spring adjustment is provided which makes it possible to bring a slight or great tension to bear against the armature. By referring to the illustration it will be seen that the core of the drop coil is bored out and that a light coil spring is placed within. At the front end this spring presses against the armature, while at the rear end a plunger is engaged. A set screw passing through a split metal bushing in the head of the coil comes into contact with this plunger. On short light lines this screw is tightened so that the spring presses against the armature and causes it to respond quickly to the ringing impulses. On long heavily loaded lines the screw is loosened so that little or no pressure is brought to bear. By this means every drop can be adjusted for its particular line. ¶ Many other valuable features are illustrated and described in the switchboard catalogue. A copy will be sent upon request.



Monarch Telephone Mfg. Co.
CHICAGO, U.S.A.

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METAL BOX
COMMON BATTERY WALL TELEPHONES

This metal box telephone is the most efficient, compact telephone made which is fitted with standard Dean circuits and apparatus—features which at once stamp it as perfectly reliable and practical. It is more substantial than the ordinary wood constructed telephone, while the transmission qualities are exactly the same.

The retaining case is made from heavy sheet steel, drawn into shape without seams and finished with a tough enamel in any desired color, black being the standard.

No woodwork to become marred, therefore will always look good.

Write for folder 3-A, which gives circuits and full description.

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Utmost SIMPLICITY of Operation

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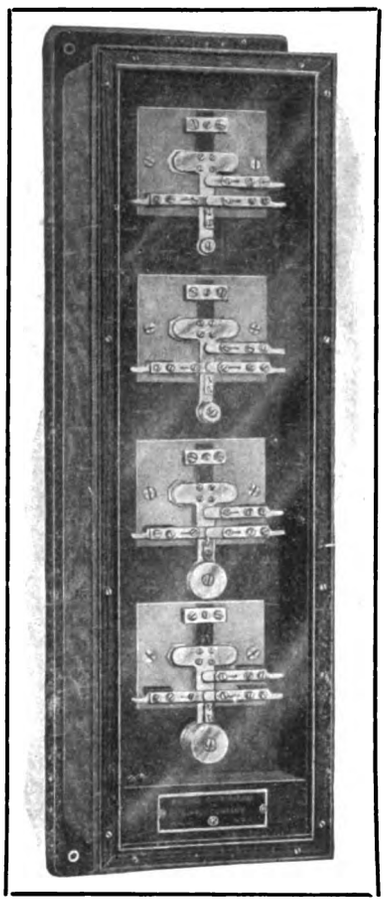
The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



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5. They can be furnished to work successfully under any load.
6. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
7. Operates successfully within the limits of 17 to 28 volts.
8. Noiseless in operation.
9. Only three contacts on each vibrator.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

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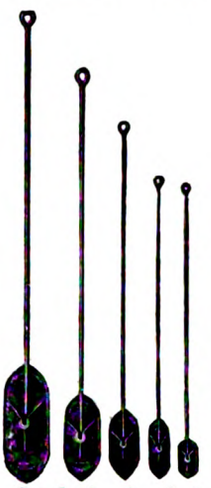

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THE United States Coin Register Co.
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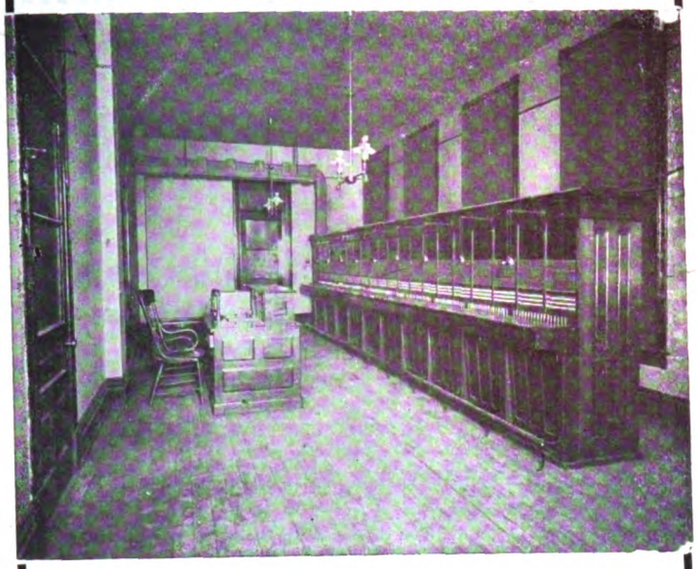

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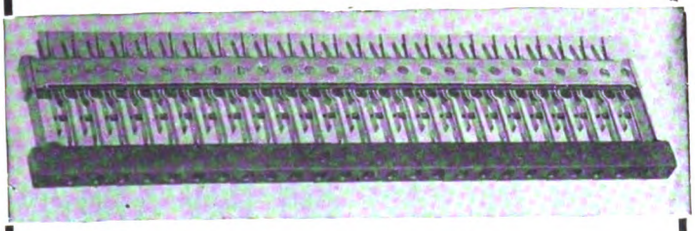
SWITCHBOARDS



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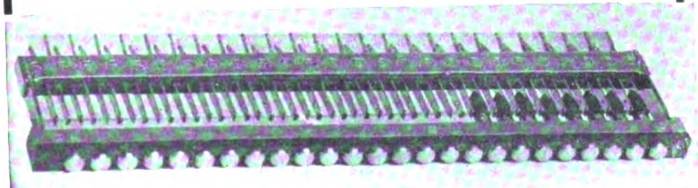

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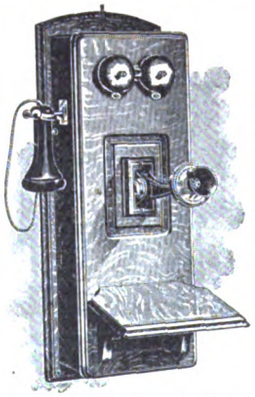

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To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

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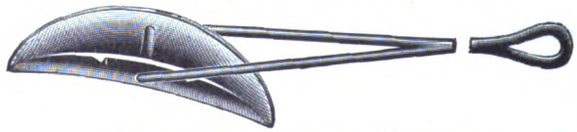

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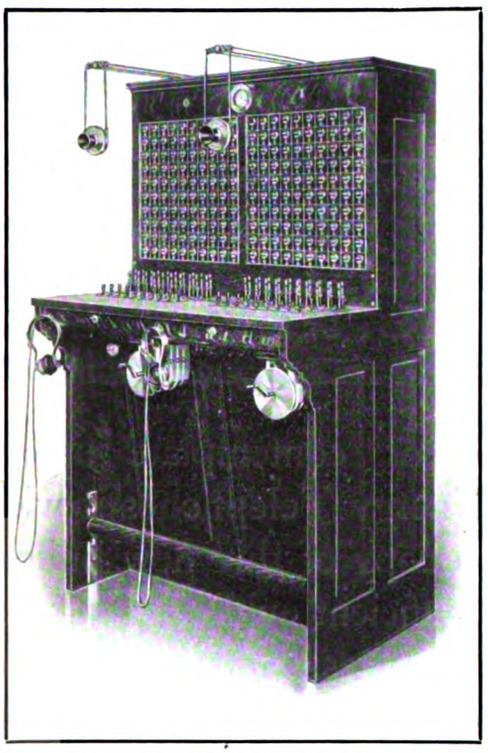

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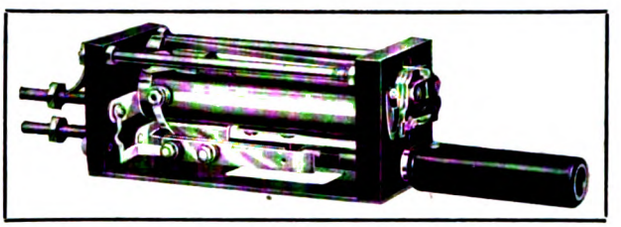

No. 68—Self-restoring switchboard drop.

One or more pair of cords connected to repeating coils, thus making it possible to connect metallic circuit and grounded lines to same board. This equipment is A1 in every particular. If you are interested we will gladly send you complete specifications and prices.

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Why doesn't it pay you as well as the best of your investments?

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Probably the company is trying to do a 20th Century business with 19th Century apparatus.

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This is the only really modern telephone system. It produces the ideal telephone service—quick, sure and secret—at half the operating expense of a manual equipment, and this service commands better rates.

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All these points bear upon the stability and value of your telephone securities. They mean dividends to you.

Over ninety per cent. of all the large orders placed during the past few years, either for new installations or replacements, have been for our automatic system, and all the companies adopting it have, from the increased earnings, been able to pay the interest on their bonds and a good dividend on their stock.

Our Automatic System has been adopted in the following cities:

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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets, CHICAGO, U. S. A.

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Central Energy Telephones

Stromberg-Carlson

TELEPHONE MANUFACTURING CO.
ROCHESTER, NEW YORK

IF you use or contemplate using Central Energy Telephones it will pay you to get a copy of this new bulletin. There is sufficient evidence in it to prove that the telephones illustrated therein are without exception the most modern and nearest to perfection of any ever placed on the market. This statement is not based on the fact that our cabinets are better finished, that we have a better transmitter or a removable hookswitch, but the telephone taken as a whole.

There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?

Stromberg-Carlson Telephone Mfg. Co.

General Offices
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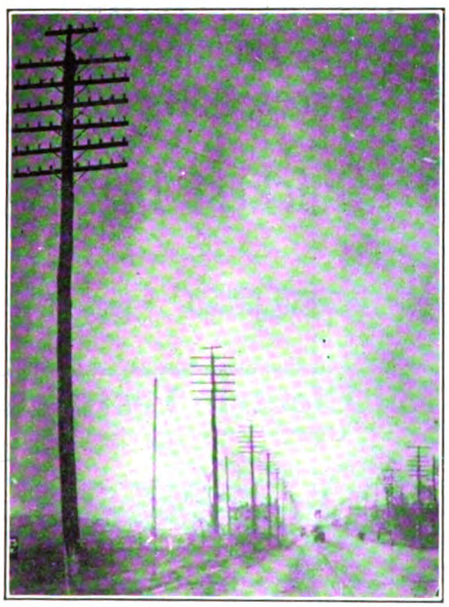
WE MAKE CABLE

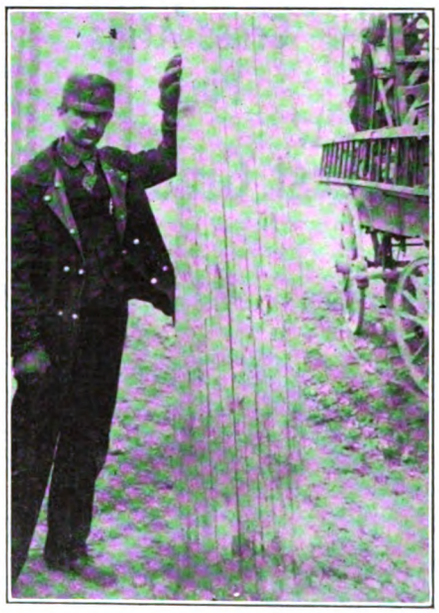
Construction Is Costly

The matter of line construction is of perhaps more importance to a small company than a large one. With the latter there is generally no difficulty in securing funds for improvements or reconstruction; whereas the small concern is limited in its expenditures. For this reason it is most important that its construction work shall be done economically; durability and future growth being given due consideration.

Open wire lines put up to stay and designed to reduce to a minimum the costs of maintenance and depreciation are excessively expensive. As the number of cross arms increase so does the size of the poles and every item in the bill for construction is increased proportionately. But after every precaution has been



An open wire line expensive to maintain, fifty foot poles, 8" tops, 20" diameter, four feet from ground.



Base of pole shown opposite. Note the comparison between it and the man.

taken, the continuity of open wire circuits is most uncertain. No matter how well the wires are installed, a sudden drop in temperature will cause them to snap and in one night sufficient damage can occur to eat up profits for six months to come.

In the spring it is necessary to have all the slack pulled out of spans. This takes time and labor, yet if not done crosses will surely occur and the continued expense for maintenance under these conditions to say nothing of the faulty service given, will prove a heavy drain upon the resources of any company.

The only way you can be saved these troubles and expenses is by either putting up cable in the first place or substituting it for your present open wire lines.

Stromberg-Carlson cable represents the highest degree of excellency in manufacture and efficiency in electrical properties. It is standard in every respect and for that reason you should use it and no other.

Write for Cable Book No. 79-B and quotations

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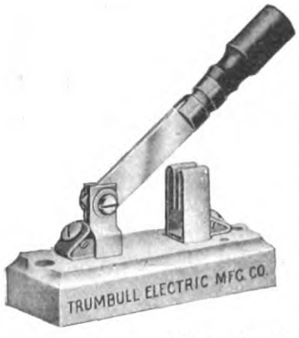
Highest Grade — Lowest Prices — Quickest Delivery



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and investigate the good points to be found only in

TRUMBULL ALL COPPER SWITCHES

Every exchange should carry a supply on hand. They can be put to many uses and are good to have in an emergency. They take the place of rural line switchboards. Write us for suggestions and ideas that will be valuable.

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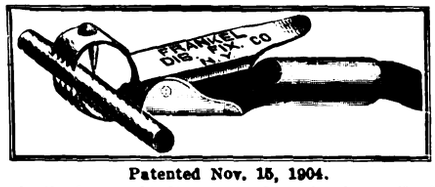
Saves Baring the Wire



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Patented Nov. 15, 1904.

The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect connection.

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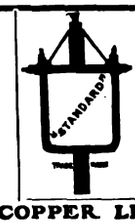

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VOLUME XIII *SATURDAY, MAY 12, 1906* *NUMBER 19*

Telephone System of French Steamer La Provence

By Edward A. Tyler.

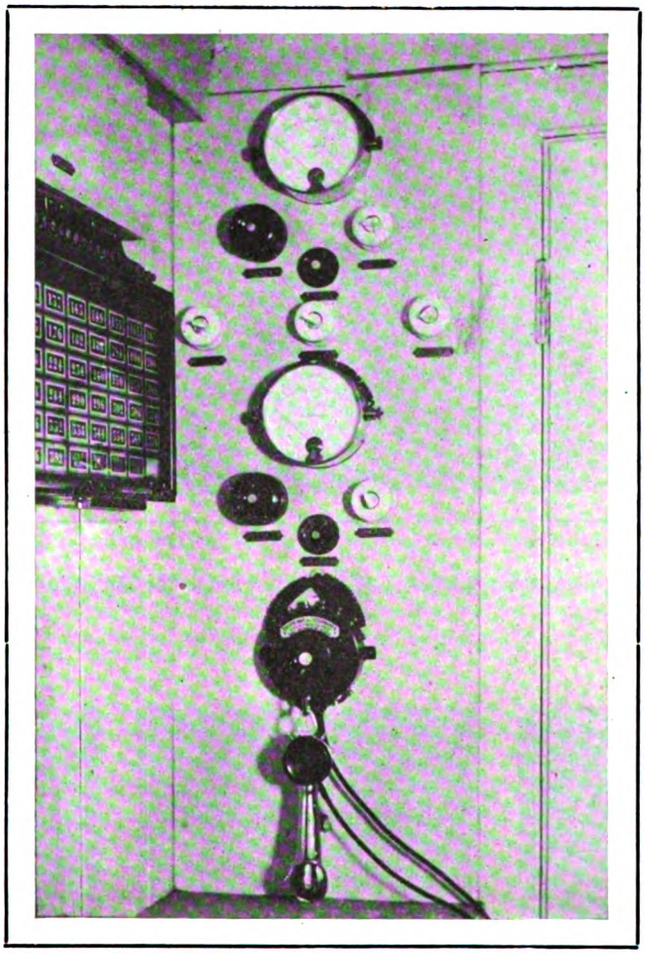
SAVING of time was the great object sought by the company which operates the new steamboat La Provence. She was built as a record breaker for the Compagnie Generale Transatlantique, more commonly known on this side as the French Line. On her first run, which has just been completed, she traversed the distance from Havre to Sandy Hook in five days, 23 hours and 40 minutes. The previous record was six days, 9 hours and 20 minutes. That is one way in which she saves time for her passengers.

Details, however, are important, and it is by the use of the telephone, among other things, that the company succeeds in securing to its passengers the fullest benefit of the period spent in crossing the ocean.

Not only is the attempt made by the use of powerful engines to make the trip from continent to continent as rapid as possible, but every device which will enable the passenger in the fullest measure to employ the time spent on board for his own ends is installed and intelligently operated.

In modern ocean travel the mere function of transportation is far from the only one which is accomplished by the steamship company. Stress of competition has made it necessary for each line to devote as much care to the development of the features of personal service as does the manager of a modern hotel. Indeed, the resemblance between the two is marked in many ways.

Of late years the tendency in constructing the Atlantic liner has been to constantly increase the size. Several of these vessels are over 600 feet long, two or three are slightly in excess of 700 feet, and there are two in course of construction which will be more than 800 feet over all. The number of decks for passenger accommodation varies from four to six. These figures will convey a slight idea of the size of the modern Atlantic ferry which in truth forms a temporary home during a period of from five to six days duration for a population averaging in the neighborhood of 3,000 persons.



Information Bureau Telephone and Measuring Instruments for Telephone and Annunciator Systems.

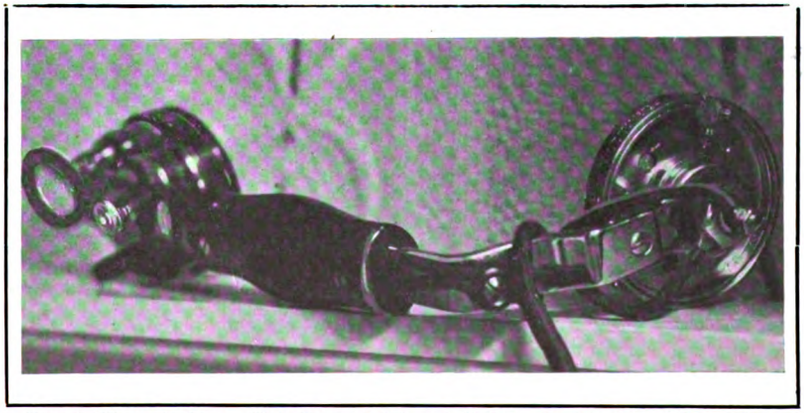
As on shore, so on shipboard the telephone has played a most important part, and by its use the passengers are enabled to travel with ease and comfort and live just as luxuriously as if they were residing in one of the finest hotels of a metropolitan city.

The S.S. *La Provence,* which is the largest passenger vessel which has been built in France, has a telephone equipment which differs in several features from American practice.

In all there are four distinct systems, as follows:

The navigating or marine system, the executive system, the cabin system, and several direct circuits used for intercommunication between the navigating and engine stations within the interior of the vessel.

Taking each system in the order named the marine service will first receive attention. There are six instruments employed for intercommunication between the navigating bridge and the engine room and after bridge. The instruments on the bridge are of the familiar watertight, loud speaking type previously described in an article on the equipment of the S.S. *America.* Only two instruments are placed on a line, and each circuit is entirely independent of the others. The forward bridge might be called the exchange, and



French Micro-telephone. Note Form of Grip and Skeleton Combination of Transmitter.

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here three of the lines terminate. The connecting stations are located one each in the port and starboard engineroom and on the after bridge. Signalling is accomplished by loud ringing vibrating bells. In the engine rooms the instruments are placed in booths on account of the noise and each is provided with a flexible ear piece fitted with a rubber cushion to further aid in the exclusion of the noise created by the heavy machinery. Attention is drawn to the illustration of the instruments on the bridge. The telephone equipment is mounted in a circular case which can be given three-quarters of a revolution so that the operator can adjust the position of the instrument to suit the requirements of the occasion.

The circuits of the executive system terminate at a switchboard located in the information bureau. This is used to place the heads of the various departments in connection with each other and also to enable the stateroom passengers to communicate with any of the officials. There are ten circuits which terminate at drops of the usual type. Connection between the lines is made by means of keys. Thus if a passenger desires to talk to the purser, the surgeon or the captain he can do so without leaving his bed, the instrument being hung on a hook within reach of his pillow.

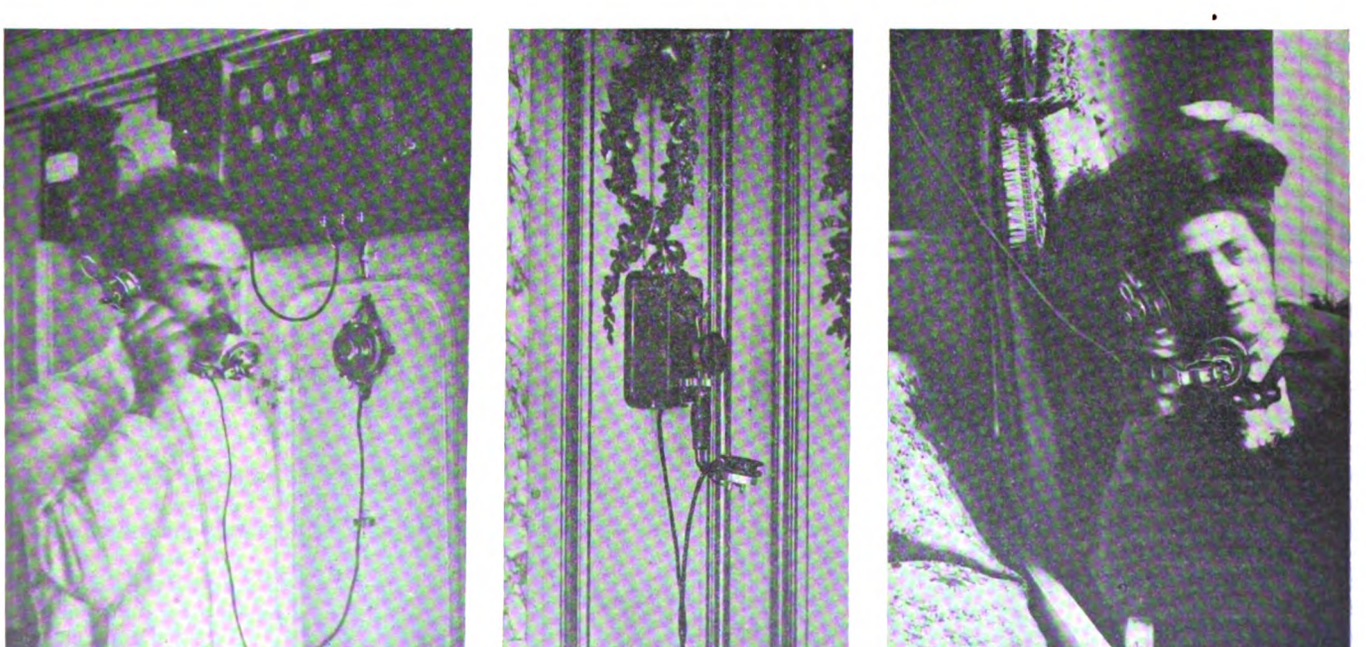
Every stateroom passenger also has direct connection with another switchboard in charge of a steward. This equipment, known as the cabin system, enables the user to call for any service performed by the steward's department. Thus meals can be ordered or messages delivered to other travellers; in fact from the time a passenger enters his stateroom he can remain in perfect seclusion and yet by means of the telephone secure all the comforts which are enjoyed by his more active fellow travellers.

Telephone station in wheel house connecting with wireless operator.

There are connected with the steward's system thirteen circuits which terminate at drops and jacks at the switchboard. A single contact plug is employed to connect the operator's instrument with the various lines. This board together with a cabin instrument in use and a photograph of a station in the grand saloon are reproduced in the illustrations which accompany this article.

The telephone circuits which comprise the fourth system connect the engineers and navigating officer's cabins with their operating stations. Thus the chief engineer has direct communication with the engineroom, the electricians with the dynamo plant and the wireless operator with the chart room.

The instruments employed for this service, although of the combined hand type, differ considerably in design from the usual type seen in this country. Transmitter and receiver are mounted back to back in the same case. Attached to the transmitter is a crescent shaped horn which serves as a handle and also as the mouthpiece. When in use the opening of the horn is at one side of the lips of the person speaking, but on account of the sensitiveness of the transmitter the spoken sounds are reproduced clearly and distinctly and



Cabin de luxe telephone equipment; switchboard, with drops and jack on left in use connecting with cabin instrument on right. The latter telephone is mounted adjacent to the bed in a convenient position for the user. The central picture shows the mounting, including the switch and bell box and also the retaining clip to hold the telephone on the hook.

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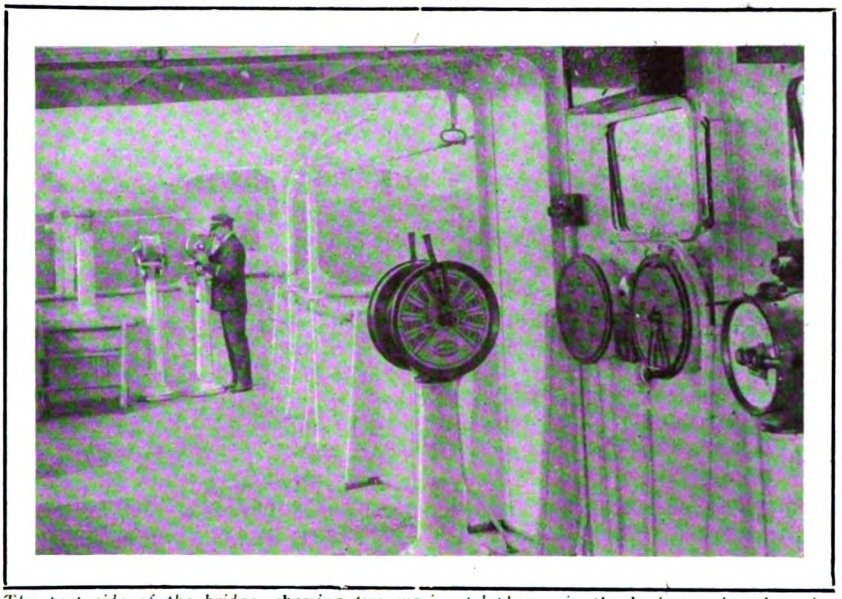
sufficiently loud to give this type of instrument the distinguishing title of loud speaking.

The receivers of the cabin telephones are provided with a stem which slides in a groove in the handle so that the user can adjust the instrument to meet his or her convenience. This feature is brought out in one of the accompanying illustrations, which also shows the peculiar construction of the back of the transmitter. Here one sees one of the unmistakable features of European practice, the usual rear casing employed to enclose the entire mechanism being absent. Instead of this a perforated back is employed to protect the rear of the diaphragm and to hold it and the button in position.



The port side of the bridge, showing two marine telephones in the background and engine room telegraph and speed indicators to the right.

The batteries for the system for communicating between the cabins and the offices center at the Information Bureau, where the switchboard is located. Here is not only the switchboard for interconnecting various lines, but also the measuring instruments which are used to determine the condition of the batteries which supply the current for talking and ringing. These measuring instruments, and the telephone which is used by the person in charge of the Information Bureau are shown in the illustration at the head of the first page. The voltmeter, ammeter and controlling switches were installed primarily for use in connection with a small storage battery, which operates an annunciator system employing lamps. Arrangements were made, however, for switching the instruments to the circuit of the telephone batteries in order that their condition might be observed. The telephone battery comprises five dry cells, each cell enclosed in a wooden case. The five are set into a compartment of a small cabinet below the apparatus shown in the illustration. This compartment is of such a size that the cells fit into it closely, and no movement is possible. The switches enable the attendant to place the ammeter and voltmeter in connection with either the telephone batteries or the storage cells. This apparatus is set near a corner, with the switchboard mounted upon the wall at the left, which runs at right angles to the one shown, in such a position that the attendant may easily operate it while using the telephone which hangs below the instrument switching apparatus. As this is a long cord no inconvenience is caused by the telephone being separated from the small switchboard with which it connects.

The instruments, including the switchboards and special switches used in connection with the battery system, are manufactured by the Societe Industrielle de Telephone, Rue 4 Septembre, Paris.

Report of John Hesketh

SPEAKING generally, it is found that the highest development is to be found in those cities giving the best of services, at rates varying with the extent to which the service is used. A cheap service is not necessarily one with a high development, and it is almost invariably inefficient.

On the other hand (although there are not lacking notable instances of high rates being accompanied by a most inefficiene service), while high rates enable a high efficiency to be obtained, it is usually accompanied by a low development. Between low rates and inefficient service, and high rates with a low development, there is a mean where the highest commercial efficiency and soundest development go together.

The question of development is inevitably connected with that of telephone charges.

It is no exaggeration to say that there are very few, if any, telephone engineers or administrators in the world who do not admit that telephone charges should be on the measured service plan; *i. e.*, the payment should vary with the extent to which the service is used.

This principle is carried into practice in various centres in the United States, Germany, Austria, Sweden and Switzerland.

It is noticeable that even where the measured service has not yet been introduced, provision is being made in modern equipments for metering each subscriber's calls separately. It is now a recognized feature in new equipments. Although the metering is not automatic, but usually effected manually by the operator, no serious trouble arises with subscribers through their accounts being questioned.

It is beyond argument that to provide separate lines for each subscriber is generally more costly than to provide apparatus to enable two or more people to use the same line. Therefore, however low the rates for separate lines may be, the rates for party lines might be lower, and would enable a larger development to be obtained.

There are several kinds of party-line services, each possessing certain advantages, and giving good service. In the United States lines serving two, four, eight, ten, or even twenty different stations have been used with every success, depending only upon the standard of service desired.

The various different systems in use the world over have been carefully studied, and I would recommend for use in Australia the following:—

On all Exchanges worked by suitable systems,

1. Two-party lines with selective ringing.

On branch Exchanges for residences,

1. Two-party lines with selective ringing.
2. Four-party lines with semi-selective ringing.

For country district service only, in addition to 1 and 2,

3. Lines up to twenty-parties, code ringing.

Each user on a two-party line should be restricted to an average of not more than ten outward calls a day, and each user of a four-party line to an average of not more than five. All inward calls (*from* other subscribers *to* party-line subscribers) are free.

Party-line calls should be restricted to not more than five minutes' duration.

These two provisions are necessary for the preservation of the privileges of the other parties on the line.

It would also be necessary to make certain stipulations as to

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the locality of party-line subscribers. That is to say, the subscribers to a four-party line should be required to be within a circle of a certain prescribed radius, or, in the case of a city, so located that the connecting wires need not cross streets.

Any revised scheme should, in my opinion, include varying charges for exchanges of different sizes. The estimated ultimate size of the exchange is that to be kept in view when fixing the charges. It is, however, well to have in view, first, a scale showing the main charges for differing services in the largest exchanges.

It is first necessary to lay down the number of calls to be included in the fixed annual charge. In laying down this number, care should be taken that it is not placed too high, or the minimum charge will prove also the maximum revenue per subscriber, as measured service users will cut down the use to a minimum. It is best to allow a minimum which is found to meet the requirements of the smaller users, larger users paying for the additional service. I, therefore, suggest two calls a working day, or 600 per annum as a fair allowance. This is about the average number of conversations per subscriber in Switzerland Additional calls should be charged for at as low a rate as will be remunerative.

Party lines should produce a revenue equal to that from a separate line, plus the cost of providing the necessary extra instrument and additional wire, and attending to all extra calls.

In my opinion, however, by far the greater proportion of our telephone users of the future will be those who use the instruments from three to five times a day, and it is by the attraction of such users that the best development of the system is attained. It is for the large majority of the so far unreached public that any new scheme should be drafted.

Large users must have the service. They know its value, and need no attractions offered to them. Smaller users must be attracted by rates in conformity with their use of the service, and by special facilities to meet their special needs.

As indicating the effect of local conditions, Stockholm may be instanced. Here operators receive 50 kr. a month, or, say, £36 per annum, as compared with £110 in Australia. The tariff being arranged on a measured service basis, the calls per subscriber are reduced, and each operator is enabled to attend to 250 subscribers; two and a half times as many as in Sydney, or over three times as many as in Melbourne.

The net effect of this is, that the cost *of operating alone* in Australia is about £2 per annum per subscriber higher than in Stockholm.

The costs of labor on construction are in a ratio equally unfavorable to similar low rates in Australia, laborers receiving the equivalent of 3s. 6d. to 4s. 6d. a day.

Add to this the fact that the cheap rate subscribers in Stockholm are connected to separate old pattern boards where they are given an admittedly inferior service, and the exceptional rates are explained.

The Swiss figures are, if anything, more misleading, for the fee indicated is the minimum, and includes no calls. Five centimes is charged for every call. Further, in the administration report for 1903, the following conclusion appears in connection with a report called for as to the ways and means to be adopted to establish a better equilibrium between the receipts and expenditure of the Telegraph and Telephone Department.

"The telephone rates do not bear a just relation to the cost of construction and maintenance."

It is worthy of note also that in 1903 (see Swiss Departmental Report) the average charge for telephone service throughout Switzerland was £3 14s. for under 600 calls for each subscriber. Yet, at the Swiss rates, if the service, instead of being used only twice a day, had been used twelve times a day, a lower average than that in Melbourne or Sydney, the average charge would have been £9 12s., or a higher rate than in Melbourne or Sydney for a less service. This takes no account of the lower pay for operators in Switzerland, £50 as against £110 in Australia.

Briefly stated, the lessons to be learnt as to rates are that a service can be given at almost any rate that is fixed, but that for a good service a good price must be paid. A bad telephone service is dear at any price.

Call offices* play a prominent part in the development of any American telephone system. They are situated in every block, and are largely used, not only by non-subscribers, but by subscribers.

In one large city the revenue for one month from prepayment instruments alone (nickel in the slot) was over £10,000. This will give some idea of the extent to which such services are used. These were not all necessarily call offices, but could be used as such if subscribers desired.

It appears to be desirable in forming a policy of telephone development, to be as liberal as possible with such call offices. It seems advisable to open them, not only where any small shopkeeper is prepared to guarantee a minimum party-line revenue, but also where the departmental officers estimate that such a minimum revenue will be obtained.

It also is desirable that the installation should be made in advance, on the assumption that the instruments will be used, instead of waiting for a weighty request for the installation.

It is just as important that the Department should seek out desirable places in which to fix instruments as call offices, as it is that possible subscribers should be sought and obtained as clients.

Call offices tend to assist in the full development of any scheme. They can be opened on a party-line if there is any doubt that a separate line would not be remunerative; and, in fact, can be graded in service just as can subscribers' instruments.

The Independent telephone movement in the United States, in my opinion, owes its success to the manner in which it has dealt with the problem of country district lines; and where it fails to obtain the desired hold upon the public, it is by reason of the failure to establish a good toll line service.

Where the Bell company, or its licensees, first appear to have invited opposition is in those places where they adopted conservative methods, confining their attention to comparatively large centres, and neglecting the outlying districts. They appear to have thought that, because their hold upon a city was strong, they could neglect the country districts. This has proved to be a most mistaken idea.

To briefly condense the conclusion, it is impossible to avoid after a close study of American conditions, I believe that to establish any telephone system upon secure lines—lines which will induce the greatest number of people to partake in its privileges, is not to leave the outside districts until the large centres are fully provided for, but to build from the outside districts in towards the large centres, or, at the very least, to give the outside districts an equal share of attention.

It were better to leave the cities to press their requirements and to go out offering the advantages to the country districts, than to do the reverse. The business men in cities know the use and convenience of a good telephone system; the farmer may not. Therefore special care should be taken that the advantages are pointed out to him, and that he is given every facility for sharing them.

By reason of their length and small number, such lines may appear costly to construct, but they can be so arranged as to serve 10 to 20 points, so that the cost *per station connected* may be reasonably low. It is useless trying to develop a country district scheme on a "one line, one instrument" basis, or upon the class of construction adopted in cities. Ten, or even twenty, instruments can work well on a line up to 20 miles long, or even longer, and the line itself may be of cheap construction. Trees should be used wherever possible, or, failing them, short poles (erected so as to be clear of traffic), bracket pins and glass insulators, or "screwed stem" insulators, with iron or steel wire, is a class of construction quite adequate for such lines.

The instruments *must* be of the best, with high-grade transmitters, high-resistance bell coils (branching system), and strong generators; but with such instruments and care, even cheap line construction will allow the users to speak over trunk lines connected thereto up to 500 or 600 miles, or even further.

*Another name for pay stations.

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But, as such country district lines usually connect to small towns, it is necessary to connect these small towns by trunk lines to the nearest large centre.

Here, again, it is found good commercial practice to build feeder lines cheaply, and to be liberal in providing them. From the experience gained on this tour of inspection, there would appear to be every justification for being far more liberal in the future in preparing estimates of the revenue to be derived from the opening of trunk lines to small country townships.

It is reasonably possible further to lay down general lines upon which an approximate estimate of the earning capacity of any proposed line may be made. For instance, there are definite known relations between the population and the trunk line revenue, and also between the construction cost and revenue necessary to make that cost commercially remunerative. Similar figures, which must be governed largely by local conditions, should shortly be obtainable in Australia, and form the basis for a similar policy of trunk line development.

It seems desirable that a special study be made of existing trunk lines, to obtain constants for future guidance.

While, however, cheap methods of construction are adopted for feeder lines, the greatest care is taken in the States that this cheap construction is not carried to the point where it imports inefficiency. Each case should be considered upon its merits, and designed so as to afford the convenience ultimately to be required, at a minimum cost.

But, while it is the practice to provide such lines freely in America, the use of them is not given free. There is a definite, and not very wide, area, within which any annual subscription entitles a subscriber to communicate from a given Exchange. Beyond this area all conversations are taxed.

The usual charge for the use of trunk lines in America is $0.006, six-tenths of a cent per mile for three minutes, That is to say, 3 minutes' conversation over a line 100 miles long costs 2s. 6d. It is an axiom in most American telephone systems that toll lines pay the dividends.

In some countries in Europe, the policy adopted in New South Wales of allowing subscribers the free use of lines joining two Exchanges far apart, and not properly to be regarded as within the same area, has been followed, but in every instance it is regarded as bad policy, to be discontinued as soon as possible.

(To be Continued.)

The Building of an Exchange

By A. H. Harris.

Distributing Pole in Business District.

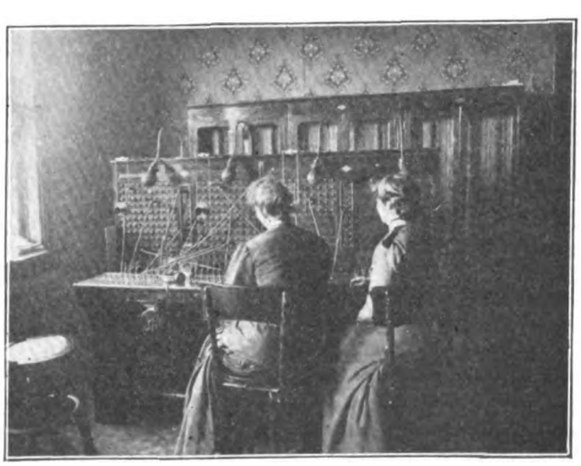
DOWN in Menard County, Illinois, is located the old town of Petersburg, with about 3,500 inhabitants, who for many years allowed the Bell company to enjoy an uninterrupted monopoly, dealing out to the citizens of the community poor service in utter indifference to their wants. Early in 1905 a few of the people asked themselves why they should not enjoy all the advantages of an up-to-date Independent exchange. The result is that at this time Petersburg has one of the most progressive and successful companies in the United States.

The first instrument was installed on July 4, 1905, emphasizing the spirit of Independence of the citizens who had arisen to overthrow the yoke of monopoly. The Petersburg Company considered that the best was not too good for them, and determined to build a system of the highest type. An important feature of their construction that is deserving of special mention is that the wires in the business and central part of town are underground. Ordinarily, such construction is not thought of except in cities of considerable size. This feature simply goes to show that the Petersburg Telephone Company sought the best and did not let cost interfere with its determination to give the citizens of Petersburg and Menard County the very best telephone service.

That they have succeeded is evidenced by their rapid and substantial growth. Toll lines have been built to all towns in the county, connecting them with the exchange at Petersburg. Farm lines have also been built, giving the farmer telephone service and at a reasonable charge. The Petersburg Company is rapidly covering the entire county, and at this time has exchanges in Athens, Greenview and Oakford, all in Menard County. In addition to this a metallic line connects its exchanges with long distance lines at Springfield.

For switchboard equipment the company has in use one four-hundred-line board at Petersburg, with a board of one hundred line capacity at each of the other exchanges. These switchboards as well as the instruments at subscribers' stations were furnished by the Swedish-American Telephone Company. Each telephone is equipped with a five-bar generator, push button and condenser in order to provide an efficient service on the long party lines under the severe conditions which sometimes arise. As the outside construction is of the highest grade, and wiring in the central offices as well as at the subscribers' stations has been very carefully done, the company has had to expend up to the present time a comparatively small amount of money for maintenance. As a consequence such money as can be expended is put where the best results to subscribers in the way of an improved and extended service may be secured.

Junction of Cable with Open Wire Lines.



The Central Office at Petersburg, Illinois.

The company is under the management of W. C. Scott, who receives the support in the community of a considerable number of local stockholders. Owing to this participation of the leading citizens of the community in its enterprise the company enjoys the full confidence of its subscribers. The company is a typical example of what can be done in a small community by the officers of an organization determined to reach the highest standard.

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Campaigning for Contracts

By R. S. Hamilton.

THE first duty of the contract agent is to familiarize himself with the general conditions of his company and that of the opposition as far as possible. Upon the result of this investigation depends the success of the canvass about to be started, and if the service of the opposition is better than his he must have some reason which will in a measure satisfy the people he desires to reach. I say in a measure, because the public, however much in sympathy with his company, will not for sympathy's sake tolerate deficient service very long if it is possible to secure it elsewhere. The second consideration is to learn the name and business of everyone who is receiving a lower rate than those in general effect and the reason for his receiving this special concession. Where extension telephones or bells are given free or at a large reduction it will be cheaper in the long run to put them on a paying basis even though it causes the loss of a few subscribers. Otherwise these instances will be continually coming up before the solicitor, and, being unexplainable, make it impossible for him to secure business he would otherwise reach. It is a fact that about 99 per cent of those who are favored with concessions consider the story too good to keep and 99 per cent plus one of those who hear of it want the same favor or nothing.

After securing the rates for the various classes of service for both companies, the next thing in order is to make a map of his lines showing the present number of instruments and the number which may be connected to the existing plant. In doing this it is well to plot each lead from the exchange, showing the number of good pairs and the street or alley where the several cut outs are made. The map should also show the number of party lines and those not filled. If the map is large enough it is well to show each drop and mark for each house in the square which is not receiving service. A similar map of the opposing lines, which is as accurate as possible, should be obtained.

When the contract agent has accomplished this he is ready to secure and instruct his solicitors. The first is by far the greater task, for it is impossible to judge by appearances to any great extent just what a man will develop. There are about three classes of solicitors. One approaches the prospect in a timid sort of way, presenting his arguments in a manner that sounds like an apology for having intruded. He backs down and out at the first "No," or perhaps at a storm of abuse for some real or imaginary wrong which is claimed to have been received at the hands of the company in the past. Another goes in with his hat on the back of his head, dressed loud, cigarette in his mouth and starts to talk in a fast and loud tone, repeating the same story to the sport and the merchant. The latter may hear him through, but the company he represents has gained nothing by the interview. The third does not go in timidly nor as though he were storming a fortress, but just happens in, possibly to buy a cigar or some small article, for he does not want to make the impression that "I've come to get you." As a prophet is without honor in his own country, so usually a local solicitor is without contracts in his own town and it is well for the contract agent to select solicitors who are entire strangers. Even though a local man may have the advantage of being familiar with the streets, places of business, and the attitude of the people generally toward his company, yet the strange solicitor is given a hearing more readily. His propositions receive a greater amount of consideration and are therefore more quickly accepted. The contract agent should never let a solicitor start out until he has all the information necessary so that it will not be necessary to say in answer to some proposition, "I'll let you know later." It is due him to give the public to understand that he is representing the company, otherwise they will say, "I haven't time to talk now, but will see Mr. So-and-So." To avoid this it is well to give each solicitor a duplicate of a general letter of instructions.

Two years ago six solicitors were put in one of our large Middle West cities, three ex-Bell men and three inexperienced ones, and the results were in favor of the inexperienced men. They did as they were instructed, while the others went about their work as they had been in the habit of doing while with the Bell Company. At the end of twelve months 73 per cent of the business brought in by the inexperienced men was still good, as compared with 32 per cent of the business secured by the experienced fellows. Of course it takes quite a while longer to get an inexperienced man ready for business and increases the contract agent's troubles at the beginning, but all things being equal I believe it is worth the while, although there are some notable exceptions to this rule.

There should also be a definite territory assigned to each man. By close application to the map the contract agent can tell just about what each man has done during the day and what he can do, as well as have before him the exact portions of the work not yet covered. If the daily reports show a reason for not getting a contract from each person interviewed who does not sign up it will aid very much in reaching those people later. It should not be necessary, however, to burden the solicitor with giving a detailed statement of these excuses, as the contract agent can secure all the information necessary verbally at the informal meeting which it is well to have each evening in order to go over the day's work and offer suggestions. In order to get the best results he must not allow the slightest rivalry to exist, and must give each to understand that all are on an equal footing regardless of the number of contracts received by each. One man may be located in a poor territory, another in one which has been recently covered or is unfriendly to his company, while another with no great ability may be placed in a locality where the people are anxious for the service.

I have in mind a man working with ten or twelve others who did not secure over 20 per cent. of the number of contracts closed by the other fellows and the reason was due to the fact that he could not close the deal after reaching the time for signing up. In his quiet unaggressive way he could explain away any complaint or flaw advanced against the service, and leave the parties with a good impression of himself and a more friendly feeling toward the company which he represented, but he could not close a contract. The writer has been with him on several occasions when up to the last minute his arguments were perfect, but it was at that particular place he seemed to go to pieces.

For these and other reasons it is a problem of no small difficulty to select solicitors. Nevertheless if the contract agent will keep in touch with the individual work every day he will soon learn the value of each man, based upon the condition surrounding him, and the systematic canvass carried out along these lines should not only increase the number of subscribers, but what is equally as important, gain the good will of the people in a locality upon which the future growth of his company depends.

MEETING OF THE TEXAS INDEPENDENT TELEPHONE ASSOCIATION.

WACO, Tex., was chosen at the last meeting of the Texas Independent Telephone Association for its second annual meeting, April 25 and 26, and now the Independent Exchange men acknowledge that the choice was a wise one because of a hearty welcome by the Hon. James B. Baker, the Texas Telephone Company, the Business Men's Club and the citizens in general, who have given a most whole hearted support to the Independent telephone movement. Delegates were first welcomed in convention by the president of the Business Men's Association and then by the Hon. James B. Baker, Mayor of Waco, who is also a stockholder in the Texas Telephone Company. Mr. Baker spoke of the rapid development of Texas as a State and of Waco in particular, and the way he handled the sub-

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ject indicated clearly that he was familiar with every condition.

A letter from Mr. James B. Hoge, president of the National-Interstate Telephone Association, was read, calling attention to the coming national convention to be held in Chicago, June 26, 27 and 28, and requesting a good attendance from Texas. Attention was called to the importance of the shield sign to advertise the Independent toll stations. This letter was ordered published.

The election of officers resulted in the choice of J. C. Casler, Fort Worth, president; C. H. Shock, Sherman, secretary and treasurer; C. W. Roberts, Abilene, first vice-president; C. A. Willison, Granger, second vice-president; Thomas O'Rourke, Shreveport, La., third vice-president.

J. B. Earle of Waco was elected delegate to the National Convention. This choice was approved by all the men at the convention, as Mr. Earle is one of the men whom the Bell hirelings most fear to meet in either a telephone subscription or franchise fight. Up to the present time these Bell men are said to have never crossed Mr. Earle's path without regretting it.

Mr. Casler, the new president, appointed a committee to audit the books of the outgoing officers. This committee reported that the books were in good condition and that the funds had been well disbursed.

The finance committee recommended establishing a clearing house association and that the sum of $500 be appropriated for the necessary printing, and recommended that the offer of Mr. Earle to establish a Clearing House in Waco without compensation except for the necessary clerical assistance and stationery be accepted. On motion a recess was taken to effect the necessary organization. The companies which reached an agreement and will operate a Clearing House, taking in others as they may care to join, are: The South Texas Telephone Company, Brazos Valley Telephone Company, North Texas Telephone Company, Texas Telephone Company, Ellis County Telephone Company, Texas Consolidated, L. D. Telephone Company, Fort Worth L. D. Telephone Company and the Granger Telephone Company. This Clearing House began business in Waco with J. B. Earle auditor.

The following committees were appointed:

Executive committee, Thomas O'Rourke, E. W. Donaway, C. W. Roberts, C. A. Willison; programme committee, Aaron Smith, J. A. Murry, C. L. Simpson; membership committee, Charles F. Speed, chairman; Aaron Smith, G. D. Woodson, M. E. Martin, A. A. Marrs.

On a motion of Mr. Shaffer the next convention will be held in Fort Worth.

The following men were shown to be present on the roll call of the secretary: T. O. O'Rourke, Shreveport Telephone Company; J. H. Murry, Weatherford Telephone Company; J. C. Casler, Fort Worth Telephone Company; A. E. Shaffer, Ellis County Telephone Company; H. H. Davenport, Hillsboro Telephone Company; O. Moore, Abbott; W. A. Logan, West; J. B. Earle, Waco; J. L. Jones, McGregor; L. Sparks, Giddens; A. L. Burge, Moody; O. S. Smith, Clifton; A. J. Hooder, Killen; H. C. Cooke, Granger; M. S. Sweet, Georgetown; C. S. St. Clair, Elgin; C. W. Roberts, Abilene; E. Graham, Harris; E. W. Gorom, Denison; Grayson County Telephone; Ward Templeman, Navasota. Others present were G. D. Woodson, St. Louis; C. L. Martin, Dallas; Charles F. Speed, Texarkana; M. E. Martin, A. A. Marrs, Dallas; J. P. Crarast, Chicago; Aaron Smith, Weatherford, N. C. Shellinger, A. R. Lawrence and C. A. Willison, Granger.

After a discussion of the toll line situation advertising and other matters in which many interesting points were brought out the meeting was adjourned subject to a call of the Executive Committee.

HOW THE OTHER FELLOW LOST.

MR. J. G. NOLEN, formerly a salesman and well known in the telephone field, tells the following anecdote in the *Telephone World*:

"A salesman sometimes has to resort to tricks that are not strictly legitimate, but when you know that your rival will stick the knife into you with cheerful alacrity if the opportunity offers, there is no difficulty with your conscience if you succeed in putting the kibosh onto him and handing him '23.'

"Once, years ago, when Independent telephony was still young and struggling with all sorts of adverse conditions, while traveling through the Middle West I stopped off at a town of considerable size with the hope rather than the expectation of selling something, for my 'hated rival' had already sold them a switchboard and most of their telephones, but still I thought it just as well to make a call and get better acquainted. The system was constructed on the common return wire plan, and when I saw that no wire in the office was larger than No. 18, I knew at once that they surely must have all kinds of cross talk, and inquiry showed that my surmise was correct.

"Judge of my chagrin, however, when I discovered that my rival was in town in company with the purchasing committee from another town whom he had brought there for the purpose of showing them the switchboard he had installed. For a few minutes I did some hard thinking. Well, it devolved upon me to get acquainted with that committee, if possible, but before doing so I slipped around to a livery stable and hired a boy to take the receiver off the hook and yell fire as loud as he could every half minute for the balance of the afternoon. Pretty soon I got two of the committee separated from my competitor and induced them to take down a receiver and listen for the cross talk in that board. They did so and heard my confederate yelling fire. 'Where is the fire?' they asked excitedly of the hotel clerk, but he assured them that a fire was nowhere in sight, but suggested their calling central, which they did, but central was ignorant of any fire, but said there had been a fire in the town about three weeks previously. Would you believe it? I actually convinced them that the board was defective in construction because the cross talk had got stored up in it during the excitement of three weeks before and that a switchboard which would store up cross talk for three weeks was not the kind for them to buy.

"I got an order a few days later and I don't think the other fellow ever did find out just why that committee got cold feet so suddenly."

TRI-STATE AND TWIN CITY COMPANIES CONSOLIDATE.

A FORMAL consolidation of the Twin City Telephone Company of Minneapolis and St. Paul, Minn., with the Tri-State Telephone and Telegraph Company of Minneapolis has recently taken place. The Twin City Company, which was a purely local concern, has now become a part of the Tri-State, which operates long distance lines and exchanges in Wisconsin, Minnesota and the Dakotas.

Originally the holders of the common stock of the Twin City Company organized a long distance company called "The Tri-State." This Tri-State company was organized under the laws of the State of Maine, and its charter allows it not only to buy and build toll lines and exchanges, but to purchase and hold stocks of other exchanges and toll lines.

In order to bring about economy of administration it was long ago deemed advisable to amalgamate the two companies, and this has now been accomplished. This action is merely one of bookkeeping, as the two companies for the past two years have really been one and the same.

The amalgamation was submitted to a vote of the stockholders, and out of $1,500,000 worth of stock $1,240,000 voted for the transfer, while not even one share voted in the negative. The capital stock of the Twin City Company is $1,500,000, with $1,000,000 worth of bonds outstanding. The capital stock of the Tri-State Company is $6,000,000. It is estimated by one of the officials of the company that fully $25,000 annually will be saved to the corporation by the deal. Under the old system separate accounts in every department of the two companies were kept, entailing an exceptionally large force in the auditors' offices of the companies.

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THE EDITOR'S PAGE

AN OCCASION FOR DISTRUST.

A REQUEST for information from a Press Bureau of any sort has come to be viewed with suspicion by all Independent companies. The business of such companies has become so large that the giving out of facts concerning it is far more likely to create a favorable impression than otherwise. Nearly all Independent companies are on a sound basis financially, and their rate of growth compares most favorably with that of rival systems. In spite of this the constant effort of the Bell companies is to belittle the danger which confronts them. While the higher officers fully realize the inroads made by the united attacks of their competitors, which are giving connections through new plants constructed from the highest grade of material, and giving good service, it is their desire to create the impression in the public mind that the Independent telephone movement is based on unsound business principles and insufficient engineering knowledge. As a conspicuous instance of this attitude of the officials of the Bell Company, we quote the following from the annual report of President Fish: "It seems clear, however, that within the last three years the general situation, in so far as competition is concerned, has become distinctly more favorable to our interests." The purpose of this statement is quite evident, but it would be interesting to learn the facts which President Fish would use to support it.

With the object in view of spreading all information which will assist in this policy of creating a false opinion of the strength of their opponents, a continual search is being carried on by the Press Bureaus in the hope of discovering a weaker member of the Independent organization. When such a one is found, an analysis of its condition is made by a skillful juggler in facts and figures. The report which he makes is spread far and wide in the newspapers. Although the entire course of a year furnishes but few examples which can be used in this way, this small number of cases serves as a basis for articles which are repeatedly published throughout the entire country; and in this way the few incomplete successes furnish a means for keeping the word "Independent" before the public in connection with articles intended to damage the cause, which appear to be genuine news, but are, in fact, simply the perverted reports furnished by the hired press agencies.

It is a familiar statement that nothing can be made to lie so easily as statistics. Therefore, it is just as well for all Independent companies to refrain from giving figures to persons of whose purpose they have no knowledge. The National-Interstate Telephone Association is collecting facts relating to Independent development, which will be used in such a way as to be of the greatest value to the movement. In the meantime all companies, even though they feel that the giving out of information can do them no possible harm, would do well to refrain from gratifying their opponents by passing over the facts which they desire. When a Press Agency asks for information it is not wanted for the benefit of the Independent companies.

DEMAND FOR MEN ON THE PACIFIC COAST.

ALONG the Pacific Coast the extremely rapid development of Independent telephone systems has produced a demand for good telephone men, which is perhaps extraordinary even at this time of general activity. The Independent companies in California are advancing rapidly, and a great deal of construction work is being done. As soon as a new plant is in place men are required to operate it. The companies find it necessary not only to have men for the present needs, but to maintain a larger force than is absolutely necessary for the work in hand, in order that their men may be trained in their methods in a suitable way to meet the requirements of the future. The coming Independent plant in San Francisco alone, according to the requirements of the franchise, will involve an expenditure of $4,000,000; and it is evident that not only the number of untrained men, but those skilled in the construction of telephone exchanges required for this extremely large plant will not be small. Farther north, in Portland and other important towns in its vicinity, the building and enlargement of Independent exchanges is proceeding at an extremely rapid rate. Large city systems are in operation or being constructed, and lines into the surrounding country are being extended as fast as the work can be done. In Seattle, at a recent public meeting, the people condemned the Bell system, and many citizens prepared to throw out the Bell telephones.

These people must have telephone service, and are anxious to have connection with the Independent system at the earliest possible moment. The result is that the Independent telephone company is having far greater difficulty in meeting the demands of the citizens who are urging it to give them connections than many companies have to secure business. Mr. C. H. Judson, who is the chief engineer of the company, in a recent letter stated that it was very easy for him to find poor men, but the sort of men he wants, men with experience, genuine knowledge of the business, and energy, are very hard to find, and the demand for them is far in excess of the supply.

CONCLUSIONS FROM THE WORLD'S TELEPHONE PRACTICE.

ON another page of this issue we present abstracts from a report to the Australian Government by John Hesketh, who is the electrical engineer of the Postmaster General's Department, which controls the telephone service. Mr. Hesketh was given the commission of visiting the important cities of the entire world to study the various telephone systems which were in use. He was to take up not only their electrical features, but also line construction, the various methods of charging for service, and the handling of business, and, in fact, to acquire as complete information upon all points as it was possible for him to do. On his return it was designed that the information so collected should be used in the laying out of a system for the Commonwealth of Australia, which should be as nearly in accordance with the lines which are considered to be the best practice not only for the present, but for a considerable number of years to come. Mr. Hesketh has made a report which briefly covers a great many matters, as he gives a general outline of the conditions which he found in various parts of the world, and makes applications to the local requirements which exist in his own land.

Many of his observations are of great interest to telephone men outside of his own country, and some of these statements we have abstracted from the report and are reprinting. They represent the true opinions of a trained engineer who has had unusual opportunities not only for observation but for gathering the opinions of other engineers of high reputation throughout the world. The conclusions which he has selected as fit to embody in a report to his government deserve the careful consideration of those connected with all the systems which he visited.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. MCMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

DESIGNATION OF STREETS FOR LOCAL LINES.

Under our State laws (New Jersey) the municipal authorities are required to designate streets on which a telephone line may be constructed. Our company is building a local line to do business within the city and has asked the council to indicate what streets we may use. This they neglect to do, as they are trying to hinder us all they can in the interests of the Bell monopoly. Can we force them in some way, as by mandamus, to make a proper and speedy designation? R. C. A.

THE law to which you refer must be act April 27, 1888, which applies only to lines through the municipality. It does not apply to a local system of lines maintained within the municipality and consequently not to your company, as you state the facts. If you have a charter from the State you are authorized to conduct a telephone business without regard to permission from local authorities and do not need a designation of streets by the council. Neither has the council power to make a designation in the case of a company like yours. New Home Telep. Co. v. Common Council of City of New Brunswick, 40 A. 628.

AUTHORITY TO USE CONDUIT.

The city franchise gives us permission to run and maintain wires "over and through" the streets. We wish to lay conduits and change from an overhead to an underground system. Can we do this without getting additional authority? A. C. C.

THE words "through the streets" do not mean "through the ground beneath the streets" nor anything equivalent to it. Your present grant would therefore not include authority to lay conduits and additional authority is needed. Commonwealth v. Warwick, 40 A. 93, 185 Pa. St. 623.

CONSTITUTIONALITY OF ORDINANCE FIXING RATES IN KENTUCKY.

AS a test of an ordinance passed by the city council of Frankfort, Ky., on February 22, 1901, an action petitioning for an injunction against the city to prevent the enforcement of the ordinance, on the ground that it is unconstitutional, has been filed by the Frankfort Telephone Company. The ordinance in question provides that the "lowest scale of prices now fixed by any telephone company as compensation for such services on or after July 1, 1901, shall remain stationary and in full force for the term of ten years."

MUNICIPAL LIABILITY FOR INJURY CAUSED BY FALLEN TELEPHONE WIRES.

A PEDESTRIAN in Manchester, N. Y., crossing the street about 8:30 in the evening seized hold of, or came in contact with, a piece of wire that hung down from a tree to the ditch between the sidewalk and the carriage way of a cemetery and received an electric shock by which he was immediately killed. An examination the next morning showed that the telephone wire lay across some electric light wires and that the insulation on the wires had worn away and that the hanging wire was a part of the telephone line. How long this piece of wire had been hanging down was a matter of controversy on the trial. The administratrix of the deceased, in suing the electric and the telephone companies and the village of Manchester, charged that the light company was negligent in permitting its wires to remain in a dangerous and unprotected condition, and that the village was negligent in allowing that condition to remain by which the safety of travellers on the highway was imperilled. The New York Court of Appeals held that it was not necessarily negligence upon the part of the deceased in having seized hold of the wire, as he might have seized it to remove it from his way. The court held that the city was not liable unless it had notice of the obstruction and the danger was obvious. The plaintiff, to show evidence on the part of the trustees of the village, read the evidence of the trustees at the coroner's inquest. This was held to be an error. It was also held to be a mistake to permit the plaintiff to prove that several months before the accident, at a place nearly a quarter of a mile away, a piece of telephone wire hung down from a pole and several people received shocks therefrom. Judgment for the plaintiff was reversed because of these errors in admitting testimony. Fox v. Village of Manchester (N. Y.), 75 N. E., 1116, 91 N. Y. S. 1094, 100 App. Div. 512.

WHEN JUDGMENT AGAINST A CITY RELEASES A TELEPHONE COMPANY.

A GARBAGE collector in the city of Chicago was killed by taking hold of a live wire which hung down from some other wires. Upon the trial there was a sharp conflict of evidence as to whether the city of Chicago or the Chicago Telephone Company was the owner of the wire which caused the death of the deceased. A judgment for $3,500 upon an appeal to the Appellate Court was reversed and a finding of fact made to the effect that the fallen wire was owned and controlled by the city, and not by the telephone company. At the time of granting the company the right to erect its poles in the alley the city of Chicago reserved the right to the top cross arm of each of the poles free of charge, for the use of the city telegraph and telephone wires. It was contended that the telephone company was liable because it had granted this right to the city, thereby permitting it to use a portion of its chartered power, and that the company was liable for any negligence on the part of the city. The court held, however, that the judgment in favor of the city of Chicago was a complete bar to an action against the telephone company. Hayes v. Chicago Telephone Company, 218 Ill. 414, 75 N. E. 1003.

RULE THAT EVERY LIGHT WIRE IS A LIVE WIRE DOES NOT ENABLE COMPANY TO AVOID LIABILITY.

AN electric company established a rule that its linemen should treat every light wire as a live wire, and that the company provided rubber gloves for men to use in handling dangerous wires. A lineman in the employ of the company was at work putting a cross arm on a pole when an electric current passed through his body causing death. His administrator, in suing the company, contended that the current came from the contact of the trolley wire of a street railway company with the wire of the electric company, and that there were no guard wires above the trolley wire as there should have been to prevent an accident. The defendant contended that the rule above referred to made the conduct of the lineman, in mounting the pole without gloves, negligent. The court held that the violation of this rule by the lineman was not conclusive evidence of negligence, but only a circumstance to be considered with others. The court held also that evidence as to the existence of an appliance known as a "guard wire" in common use for the purpose of preventing trolley wires from coming in contact with other wires, was properly considered by the jury in support of the plaintiff's case. A recovery by the administrator of the deceased was therefore sustained. Mahan v. Newton & B. Street Railway Co., 75 N. E. 59 (Mass.).

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IN THE OPERATING FIELD

ANOTHER EVIDENCE OF THE GROWTH OF THE INDEPENDENT TELEPHONE BUSINESS IN PENNSYLVANIA..

AMONG the many evidences of the growth of Independent telephony, there is none which illustrates the exact state of affairs better than the directories of the various companies. Comparison between present and past issues invariably shows a marked increase, not only in the number of subscribers, but also in the list of toll and long distance points. In some cases it is even necessary to add loose leaves giving the names of parties who have been connected up since the directory went to press. As an illustration of this rapid growth, the latest issue of the directory of the Huntingdon and Clearfield (Pa.) Telephone Company is an excellent example. In it are listed 227 subscribers, who were secured too late for classification. These are distributed throughout fifteen different towns and villages connected with the system.

This company has in operation seventeen exchanges, which furnish service to sixty-six towns and villages, besides connecting with nine rural telephone companies.

The list of toll and long distance points which can be reached numbers 414 cities and towns in Pennsylvania, Maryland, West Virginia and Ohio, and includes many of the principal cities in those States. In the territory covered by them there are said to be four Independent telephones to every Bell instrument, and this proportion is constantly increasing.

At the foot of every page of their directory are notes which show the advantages of the service furnished, particular attention being called to the excellence of the toll system.

The officers of the company are: Ellis L. Orvis, president; A. W. Lee, vice-president; G. H. Lichtenthaler, treasurer, and W. L. Malin, general superintendent.

GOVERNMENT ACQUIRES COMPLETE CONTROL OF TELEPHONE BUSINESS IN SWEDEN.

By Noleye.

THE Stockholm Allmänna Telephone Company, which was founded by Director Cedergren and the Ericssons, who are now the principal figures in the Independent company which is building an extensive plant in Mexico, has closed a contract of sale with the Swedish Government on March 8th, whereby that Government takes over its business for the sum of 16,541,000 Swedish crowns, plus 80,000 crowns for inventory and furniture. The Allmänna (General) Telephone Company had bought up the Bell company in Stockholm many years ago, and had at the time of the transfer over 42,000 subscribers. Immediately after the Bell company was bought out the Government started a telephone system of its own in opposition to the General company, but in spite of the greater facilities which the Government could offer its subscribers in the way of long distance communication, by utilizing existing telegraph poles for long distance lines and thus connecting up about 82,000 instruments all over the country, they found it a rather hard proposition to combat the lively Allmänna, the pioneers of the telephone in the country. After some years of pourparlers they at last succeeded in coming to an arrangement which now gives the Government full control of the telephone business in Sweden.

The arrangement has been well received on all sides; the Government has become possessor of one of the finest telephone systems in the world, and can now develop its business indefinitely without opposition of any private company; the subscribers will be enabled to use the Government long distance lines at an extremely low rate (for instance, from Stockholm to Goteburg, about 300 miles, for 13 cents for 5 minutes); and the shareholders of the Allmänna ought not to be unhappy over the $4,500,00 in cold cash and good Government bonds which they receive.

INDEPENDENT DEVELOPMENT IN THE COAL AND COKE INDUSTRIAL CENTRES.

THERE are few cities in the State of Pennsylvania where there are better telephone facilities or more efficient service and reasonable rates than at Uniontown. This is due to the Maryland, Pennsylvania and West Virginia Telephone and Telegraph Company, or as it is better known, the Tri-State Telephone Company. The history of the inception and development of this company is an interesting one and is based solely on the desire on the part of prominent men to give Fayette county first class telephone service. The first telephone connection between Fayette county and Pittsburg was made by the Bell Company in 1889 and they occupied the territory exclusively until 1898 when the Tri-State entered the field. It covered only Uniontown, Connellsville, Dunbar, Masontown and a few minor places, operating less than 600 telephones. The opposition to the old company caused a material lowering of prices for service, but this only held for a year when the controlling interest was secured by New York parties and the service was allowed to fall off. So unsatisfactory did conditions become that a number of leading business men of Fayette county, headed by the late Ira E. Partridge, organized and bought the line and proceeded to make it a benefit to the people. There are now thirteen exchanges, more than 3,000 local subscribers in the county and a long distance service connecting with several thousand Independent telephones in Pennsylvania and surrounding States. The Tri-State Company is not waging a rate war against any opposing company, but is giving the people of Fayette county the best service at most reasonable rates. All of the stockholders and officers are men closely identified with the best interests of Fayette county. The Tri-State rates are $24 for offices and places of business, $18 for single line for residences, and $12 for residences on four party line per year. This includes service throughout the county where the Tri-State lines extend and to Scottdale and is not limited merely to the patrons of a single exchange. The officers of the company are Hon. R. E. Umbel, president; Robert F. Hopwood, vice-president; John M. Core, secretary; F. H. Rosboro, treasurer; Charles A. Berg, general manager and superintendent.

INDEPENDENT COMPANY IN WABASH, INDIANA, ERECTS NEW BUILDING.

THE Home Telephone Company at Wabash, Ind., is arranging to erect a new business block for its own use, and to install a $10,000 central energy multiple switchboard. The company has 1,200 telephones in service, and additional facilities are greatly needed. The Central Union Telephone Company has but twenty telephones in service, and it proposed to abandon the local field if the Home Company would handle its toll business. The offer was refused in order that the company might be in a position to retain its connection with other Independent lines, which it considers will offer a more valuable service.

HOME COMPANY BUYS FRANCHISE FOR SAN FRANCISCO.

INDICATIVE of the faith of the people of California in the future of San Francisco, is the action of the Home Telephone Company, which, five days after the appalling disaster which placed six square miles of the city in ruins, paid $100,000 for an Independent franchise and filed a bond for $250,000, which guar-

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antees to the city the expenditure of $2,000,000 within the next year, and another $2,000,000 during the year following.

It is interesting to note that of the $100,000 paid for the franchise, $75,000 was in the nature of a donation to assist in the upbuilding of the city, as the amount bid was only $25,000. Preliminary work upon the construction of the system will be started at once, and it is expected that as the new buildings are completed to take the place of the ones destroyed the company will be enabled to furnish service to the occupants.

CENTRAL ILLINOIS ASSOCIATION HOLDS ANNUAL CONVENTION.

THE Central Illinois Independent Telephone Association held its fourth annual convention in Peoria on Monday, May 7, at the Fey Hotel. The programme included papers on "Toll Accounting," J. S. Daily, Chillicothe; "Construction," Jno. H. Sullivan, Havana, presented during the morning session.

In the afternoon an interesting address was delivered by G. H. Glass, Pekin, and papers were read as follows: "What is the Bell Company Up To?" J. C. Kelsey, Chicago; "Our Duties to the Public," Hon. C. B. Cheadle, Joliet; "Maintenance of Central Energy and Magneto Switchboards," G. O. Baker, Peoria.

The convention was well attended and many interesting discussions which were very useful to those in attendance.

DEPUTATION VISITS PREMIER LAURIER TO CONFER REGARDING MUNICIPAL TELEPHONES.

A LARGE and influential deputation waited on Sir Wilfred Laurier, Premier of Canada, a few days ago asking for legislation to enable provincial governments to expropriate the Bell lines. Delegates were present from every province and many strong statements were made regarding the excessive rates charged by the Bell Company. Sir Wilfred appeared greatly surprised at the number of delegates present and promised to give his consideration to any measure brought before Parliament. It is expected a bill will be introduced at the present session permitting provincial governments and municipalities to expropriate any lines they desire to own, and conduct under municipal ownership projects. Many people of Canada are convinced that such an act would reduce the telephone rates by more than 50 per cent. So far the Bell Company has made no open move in the matter.

COMPARISON OF BUSINESS TELEPHONES

TAKEN FROM THE DIRECTORIES OF

CUMBERLAND TELEPHONE CO. AND THE LOUISVILLE HOME TELEPHONE CO

LOUISVILLE, KY., FEBRUARY ISSUE, 1906.

BUSINESS TELEPHONES	TOTAL NUMBER USING TELEPHONE	NUMBER USING BOTH HOME AND CUMBERLAND	NUMBER USING HOME ONLY	NUMBER USING CUMBERLAND ONLY
Banks and Trust Companies	28	27	0	
Groceries, Drugs, Dairies and Meat Markets	1,021	414	468	139
Breweries and Wholesale and Retail Liquor Dealers	790	283	453	54
Government County and City Offices	136	96	24	13
Lawyers and Doctors	821	400	291	130
All other Business	3,300	1,440	1,348	512
Total	6,096	2,662	2,484	949

The relative value of Bell and Independent service in Louisville, Ky., is indicated by the figures in this table.

PLANS FOR IMPORTANT MERGER OF INDEPENDENT COMPANIES APPROACH COMPLETION.

A MEETING of the stockholders of the Home Telephone Company of Fort Wayne, Ind., was held on April 30 when the final steps to complete the merger of the Home and the National Telephone companies were brought up for consideration.

It is said that the capital stock of the merged company, to be hereafter known as the Home Telephone Company, is to be $600,000. The new issue of stock is $350,000, preferred 6 per cent. cumulative, of which $250,000 goes to the owners of the National at 90, and the other $100,000 is to be placed on the market to raise funds for extensions of the toll lines. One of the extensions is to be a direct line to Indianapolis to relieve the congested condition of the circuits now in use. Applications have been filed for more than $25,000 of the new issue of preferred stock at par. The Home company directors paid a semi-annual dividend of 1½ per cent. last week. The stock of the expiring National reached its high mark of 87½ for four shares, showing the favor in which the merger is held by the telephone investors of Fort Wayne.

The owners of the South Bend Telephone Company, most of whom live in Fort Wayne, are reported to have received an offer from the St. Louis Independent syndicate to take over the South Bend plant, the payment to be made in securities of the new company. The South Bend plant is new, and is one of the moost prosperous in Indiana. The directors, at their meeting a few days ago, declared a semi-annual dividend of 1 per cent.

MICHIGAN BELL COMPANY MAKES OUT A POOR CASE.

THE Michigan State Telephone Company publishes each month a Gazette for distribution amongst its agents and employees. In the issue which followed the convention of the Independent men of the state the company took occasion to publish in this Gazette a hit at the Independent people entitled "Jollying Themselves Along." It referred to a card which was said to have carried the words "Keep on Smiling" as being worn by every delegate to the convention, and its purpose was to convey the idea that the Independents were in a pretty tight fix, and had to resort to artificial means to keep up their courage.

Of course every man who was at the convention is willing that the Bell company should have its little joke, because he knows that it assumes both a condition and a sentiment which does not exist. And it looks, too, as if the title "Jollying Themselves Along" would afford an interesting suggestion for the object of the article in the Michigan Gazette. As will be seen from a reproduction of the actual card, the article not only misstated such wording as was used, but omitted the words, "With Cass, Nagel Electric Co.'s Man."

As a matter of fact these cards were distributed by one of the jovial and popular representatives of the Nagel Electric Company, of Toledo. If the Michigan State Telephone Company is going to jolly its employees, it really ought to look for a text which it can state in full without missing the point.

NEW INDEPENDENT COMPANY APPLIES FOR FRANCHISE IN MONTANA.

APPLICATION for an Independent franchise in Anaconda, Montana, was recently made to the city council. The company is to be known as the Montana Independent Telephone Company and it proposes to operate exchanges in Anaconda, Butte, Helena and other towns throughout the State. Amongst the men interested in this project are Elmer B. Jones, T. Augustus Heinz, Charles J. Kelley, H. A. Gallway, Henry Mueller and Herbert B. Brown.

TELEPHONE COMPANY AT VINCENNES, INDIANA, PASSES TO NEW CONTROL.

A CONTROLLING interest of the Knox County Home Telephone Company, of Vincennes, Indiana, which is owned by W. R. Gardner, William Morrison and A. H. Yoder, of Toledo, Ohio, has been secured by the Central Home Telephone Company, of Louisville, Ky. W. H. Moore, the present superintendent, will remain in office and the directors will be retained.

The Home Company has 1,300 telephones in use in Vincennes while the Bell Company has only 600. The Home Company also connects with almost every other exchange in Knox county and gives free service over the whole of Lawrence county, Illinois, which lies just across the Wabash River.

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QUERIES

CLASSIFICATION OF CONNECTIONS.—(693.)

Will you kindly explain just the difference between the different kind of switched connections? That is, how does a trunk or toll connection differ from a regular connection from subscriber to subscriber? How can a connection be trunked when both subscribers are in the same exchange? A. B.

The simplest form of connection is that in which both the plug which is inserted in the jack of the line connected directly with the line of the calling subscriber, and the plug which is similarly inserted in the jack connected with the line of the called subscriber are handled by the same operator. Such an operator is called an A operator or subscriber's operator. The connection is a direct connection, employing a single pair of cords. A simplified circuit through which the call is transmitted is shown in the upper part of Fig. 693a, where A is the subscriber's station, wired directly to a jack in the switchboard. The operator inserts in this one plug of the pair, the other plug of the same pair being inserted in the multiple jack of the called subscriber. This jack is directly in front of the operator, and no apparatus not capable of being brought into the connection by her without assistance is used.

A trunk connection brings another element into the circuit. For example, if the trunk is operated by a call wire, the operator who receives the call notifies over the call wire a second operator, who assists in making the connection. In this case, when the connection is established, it goes through a circuit similar to that represented in the greatly simplified diagram shown in the lower part of Fig. 693a. Here the subscriber A is connected to answering jack *a*, in which is inserted one plug connected to cord *c*. One plug of this cord is inserted into jack *b*, which is located in an outgoing trunk multiple in front of the operator receiving the call. This jack *b* is connected by means of a pair of wires to plug *d*, contained in a special circuit known as the incoming trunk circuit. This plug may be located at an incoming trunk position in either the same office as the one to which the calling subscriber's line connects, or another office. The plug connected to the trunk circuit is connected to the jack *e*, which is tapped to the line of subscriber B. It will be seen that in this case the connection is under the control of two operators.

The third class of connection is a toll connection, which is

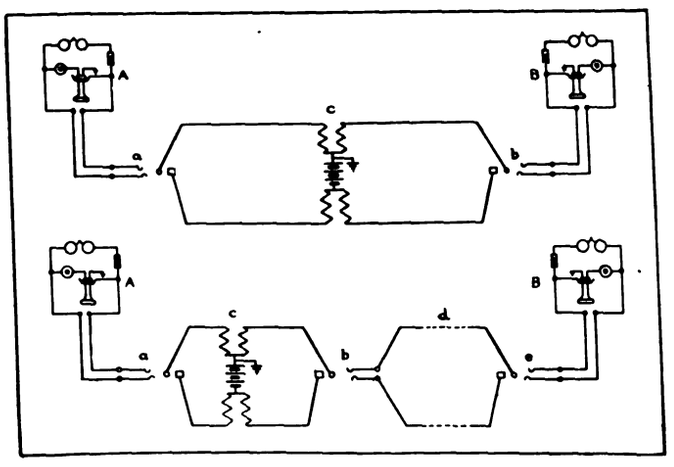

Fig. 693a.

made in various ways according to the type of switchboard in use. The most complicated connection which arises on this class of service is illustrated by diagram in Fig. 693b. In this case the subscriber's operator connects the subscriber with a special operator, and allows him to state his call. The connection is then discontinued, and when the desired line can be obtained the toll operator calls back to the subscriber's operator through an incoming trunk position. The way in which the connection is established in a typical case is by the insertion of plug of cord *d* into the jack *c* which is connected with a plug at an incoming trunk position in the same or a distant office. This plug of the incoming trunk circuit is in turn inserted in jack *a* of the desired subscriber's line, putting him in connection with the toll operator. The other plug of toll operator's cord *d* is inserted in jack connected to line *c'*. This jack leads to an in-

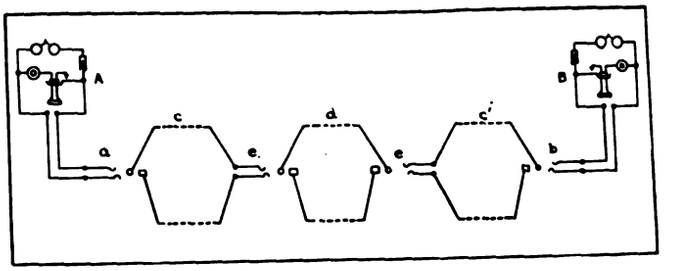

Fig. 693b.

coming trunk in a distant office, which is connected with line *b* attached to the instrument of the desired subscriber B. In the case of a connection built up through several offices, the jack *c'*, instead of being connected directly to the plug of incoming trunk, will be connected to another jack in a distant office, and a cord similar to that shown at *d* would be used to connect the jack of the incoming line to that connected with the incoming trunk terminating in the desired exchange. It will be seen in this way that a connection may be built up by switching through a considerable number of offices without altering the essential features of the diagram.

Answering your second question, a trunked connection refers rather to the method of handling the call than to the location of the subscribers at whose instruments the connection terminates. There are some offices where it has been found economical not to carry multiples of all lines in front of all operators at the subscribers' board. Here it will be evident that the call must be trunked, as described above.

NOISE FROM ELECTRIC LIGHT CIRCUITS.—(694.)

In this city the light people have a Fort Wayne system A. C. 2,300 volts primary. The leads for the lights in some instances are right under us, in some cases we are on the same poles. My trouble is a pretty heavy induction when they run, which is only at night. I have a good ground on all of my cables, which are overhead. Will a bond from each one of my cables to the ground side of the Light Company's machine do any good? I have been in other cities where the same conditions exist as here, but they don't get induction, but their cables are underground. C. F. L.

It is unusual to run high potential alternating light systems with a permanent ground at the power house. Whenever one of these systems becomes grounded the inductive effects on telephone lines are greatly enhanced, due to the reason that one of the wires no longer neutralizes the other in the electrostatic inductive effect on the telephone lines.

It is very improbable that bonding cables to the ground side of the machine, assuming that it is grounded, would be beneficial. The bonding is usually resorted to in direct current systems to preserve cable sheaths from electrolysis and would not apply in this case.

The remedies for this trouble consist in having the cable sheaths well grounded and keeping the electric light systems free from ground.

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WANTED—Position wanted by an all round telephone construction man who is thoroughly competent, sober and reliable. Best of references. Have completed course in telephone engineering. Address Box 587, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 587

WANTED—Position as manager in exchange of 1,000 subscribers or less. Have had five years' experience in telephone business and am graduate of International Correspondence Schools. Best of references. Address Box 597, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 597

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TELEPHONE PATENTS

AUTOMATIC TELEPHONE SELECTOR SWITCH.

A. E. Keith, John Erickson and Charles J. Erickson, Chicago, Ill., patent (No. 815,321; dated March 13, 1906; filed May 2, 1905; serial No. 258,509) and assign to the Automatic Electric Company, Chicago, Ill., an automatic telephone selector switch.

This invention relates to the step by step switching mechanism employed in automatic systems and particularly to devices known as "selectors." As the patent requires 54 drawings for a clear elucidation of the claims involved it will be impossible to furnish a description in the space at our disposal, and we therefore suggest that all parties interested procure a copy.

TELEPHONE BOOTH.

Edythe Prudence Garney, Scranton, Pa., patents (No. 811,140; dated Jan. 30, 1906; filed April 1, 1905; serial No. 253,253) a telephone booth.

The essential feature of this invention lies in the use of a ventilating fan placed in the roof of the booth which, while producing a circulation of air, serves to break and dissociate the sound waves or vibrations as they pass through the ventilating opening. As a further means of making the booth sound-proof a valve is provided which automatically seals the booth when the fan is not at work.

TELEPHONIC RELAY.

John Trowbridge, Cambridge, Mass., patents (No. 814,411; dated March 6, 1906; filed July 14, 1905; serial No. 269,628) a telephonic relay.

This invention relates to the transmission of electric undulations and discloses a method for reinforcing them by means of a relay which is so constructed as to secure the desired result without impairing the clearness of the transmitted sound. The inventor states that heretofore a great deal of difficulty has been experienced in the operation of relays for similar purposes because the practice has been to place the transmitter in direct contact with the receiver diaphragm, thus loading the diaphragm at a point where loading has the most detrimental effect upon it. This he overcomes by means of independent adjustment of the parts, the communicating medium being an air chamber.

Illustrating the principle of this invention the inventor exhibits three different methods of construction, one of which, Fig. 2, is herewith reproduced. D represents the usual receiver diaphragm, and D^1 is a supplemental diaphragm attached to the front electrode of the transmitter T. D^1 is formed with a flange or rim turned towards the diaphragm D. It will be evident from an examination of this arrangement that the transmitting and receiving members can be adjusted independently of each other and yet any electromagnetic vibrations which actuate the receiver D

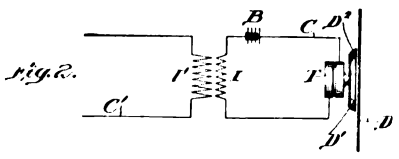

Fig. 2.

will be communicated to the transmitter T through the medium of the gaseous material between. An even balance is maintained between the two because the atmosphere has free access to the space separating the diaphragms.

In connection with this invention the inventor refers to patents Nos. 756,436 and 756,437, and specifically to the latter, in describing the application of the air chamber to the mechanical construction of a relay, claims for which are contained therein. Fig. 4 illustrates the principles involved. M_1 M are permanent magnets suspended between the poles of which is the armature A supported by the rods P, P^1. To the rod P^1 is atttached the diaphragm D referred to in connection with Fig. 2. D^2 is a sustaining diaphragm solely employed to hold armature A in position by means of the rod P in conjunction with rod P^1.

In operation current traversing the circuit C^2 passes around the coils of the armature, causing it to oscillate between the poles of the magnets. These oscillations are conveyed to the diaphragm D

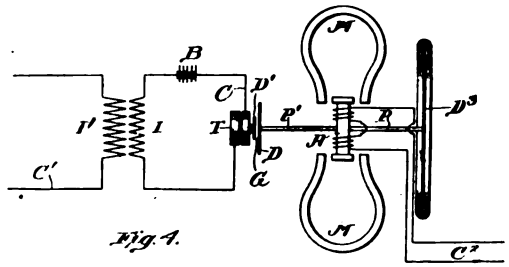

Fig. 4.

through rod P^1 and thence by means of the gaseous intermediary G to the supplementary diaphragm D^1 and the transmitter T. The transmitter performs its usual functions and through the operation of the induction coil I the reinforced electrical vibrations are transferred to the circuit C^1.

EARTH AUGER.

Ira D. Kemmerer, Lincoln, Neb., patents (No. 814,850; dated March 13, 1906; filed December 23, 1905; serial No. 293,128) a tool for digging holes.

The object of this invention is to provide a means whereby a hole for the reception of a pole can be quickly excavated. This the inventor accomplishes by means of a crescent shaped blade of suitable length, which has its longitudinal edges sharpened. The base of the blade is tapered to a point to facilitate its entrance into the earth and the upper part is extended to a shank or handle to which a cross bar can be attached. In operation a cone shaped hollow is first excavated and then filled with water. The point of the blade is then forced into the earth at the edge of this hole and by vibrating the handle by means of the crossbar the tool is sunk to the proper depth. It is then given one and a half or more turns and withdrawn. The cone of earth is supposed to adhere to the blade and be removed at the same time. The use of water is for the purpose of facilitating the entrance of the tool and to make the cone sticky enough to adhere to it when withdrawn.

TRANSMITTER.

John Z. Miller of Erie, Pa., patents (No. 809,831; dated Jan. 9, 1906; filed Oct. 19, 1904; serial No. 229,171) a transmitter.

To a circular rear plate, fitting the interior of a casing is attached an electrode, which forms the rear contact member. Surrounding this is a felt ring, which forms a containing cup for the variable resistance material. The front electrode is attached to the diaphragm and is small enough in size to fit into the interior of the felt ring. The upper surface of the felt presses evenly against the diaphragm and thus acts as a dampening device. The diaphragm is insulated from the frame, a conducting member being carried to an insulated part on the rear plate. The inventor claims by this construction to secure moisture-proof construction, durability and uniformity of operation.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A NEW HEAT COIL PROTECTOR.

ON March 20, 1906, Frank B. Cook had issued to him a very broad patent on an entirely new type of heat coil protector. This patent is numbered 815,406 and is entitled "Automatic Electrical Self-Soldering Reset for Thermal Protectors."

There are forty claims in the patent, many of which are very broad, and in prosecuting this patent before the Patent Office not a single reference was cited which showed a device anything like this new Cook protector. This goes to show what a radical change from existing ideas has been made by Mr. Cook, and how far he departed from the present design of protective apparatus.

The protector covered by patent No. 815,406 is not a self-soldering protector, but it had all the advantages of the self-soldering feature combined with other brand new and exceedingly important features. One of the novel points about the protector is that in resetting a coil which has operated a test of the protector is made. Should the coil be burned out or short circuited, the operation of resetting it indicates at once, automatically, that the coil is imperfect and it simply cannot be reset. This is a very strong point of advantage over the self-soldering protectors, for in any of the existing types a coil may be burned out, or short circuited, by an abnormally strong current, and can still be reset, because the solder has hardened. If the coil is not carefully tested after each operation of a self-soldering protector, a defective coil might cause a great deal of damage, because a short circuited coil is no longer efficient. This is impossible with Cook's new device, as a heating current is closed through the heat coil after operation to reheat and automatically reset the coil to operative position.

The feature of reheating and resetting the device for another operation, is broadly covered in the claims.

This can readily be seen by reference to one of the claims, which reads:

"An electrical-circuit protector comprising means operable upon an excess of current, means for supplying heat to the device after operation, and means for resetting the device for another operation when thus heated."

The resetting of the protector is accomplished by an ingenious little device which is applied to the protector (1) to supply current thereto for heating; (2) to reset the protector to operative position when sufficiently heated; (3) to automatically cut off the heating current when the protector is reset, and (4) to hold the protector in its reset position until the solder cools.

The mere fact that, as stated above, the Patent Office was unable to find anything similar leaves this patent free from interference of any kind, and the manufacturers state that it is therefore free from danger of litigation.

THE GENERAL STORAGE BATTERY COMPANY, 42 Broadway, New York City, is to make two important exhibitions of its batteries and supplies during the month of June. One of these will be at the meeting of the National Electric Light Association at Young's Pier, Atlantic City, N. J., on the 5th, 6th, 7th and 8th of June, 1906, and the other at the Master Car Builders and Master Mechanics' Convention at the steel pier at Atlantic City from the 13th to the 20th of June, 1906. On each of these occasions the company will have a display of the same nature as the one at the Electrical Trades Exposition in Chicago, which attracted so much attention. The company manufactures cells not only for heavy work, but of types suitable for the various classes of telephone work and others particularly adapted to special systems, such as railway signalling and yacht lighting—all coming under the general classification which distinguishes the Bijur "High Duty" batteries from those of other manufacturers.

One of the valuable features of these exhibitions will be the No. 1 switchboard, for use in connection with fluctuating loads, such as electric elevators, electric hoists, etc. The company states that by closing the large solenoid switch on the front of the board instantaneous loads of 2000 amperes are drawn from a cell whose normal capacity is 84 amperes. In order to keep the heavy rushes of current from the generator, a Bijur Booster System is used, with such regulation that, of this 2000 ampere jerk, only 9 amperes or less than ½ of 1 per cent reach the generator. The No. 4 charging booster consists of a constant speed motor, driving a separately excited generator. When charging a Bijur "High-Duty" storage battery, the armature of the separately excited generator is connected in series with the station bus bars and the combined voltage of the two sending current into the battery. As the battery charge proceeds, its voltage increases and the excitation of the separately excited machine is increased accordingly to maintain a constant charging current to the battery.

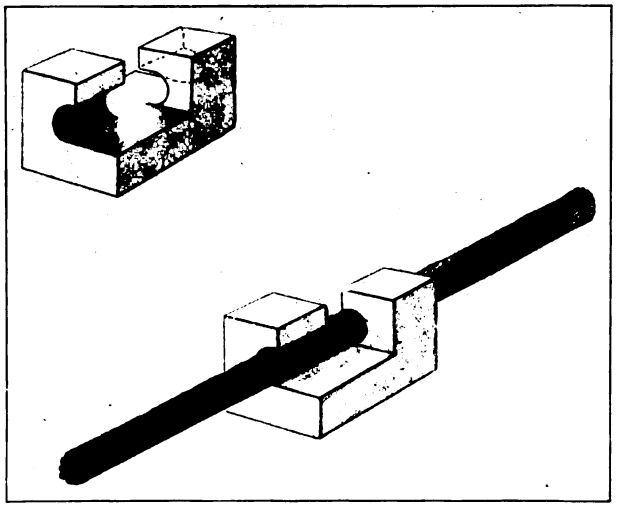

Fig. 1. Porcelain bridgework used for carrying the cables in the new system of installation.

At these exhibitions the company will have a staff thoroughly competent to convey much valuable information concerning its batteries and other apparatus, and will be pleased to see any telephone men or other persons interested who may be able to visit Atlantic City at that time.

A NOVEL SYSTEM OF INSTALLATION FOR UNDERGROUND CONDUCTORS.

A NEW method of installing underground conductors for electric light, power, telephone and telegraph systems, whose economy and efficiency are claimed to make it superior to the duct system, is being introduced by the Electric Cable Company of 42 Broadway, New York City. This method is an improved form of the wooden conduit system, and is being largely employed by cable engineers in Germany. Extensive use is made of Voltax, the new insulating compound manufactured by the above concern, whose high potential and insulation resistance capacity, officially established by a series of exhaustive tests made by the Electrical Testing Laboratories of New York City, have demonstrated its value in the insulation of high and low tension conductors.

In making the installation according to the above method, there is dug a trench about 18 inches deep in which a wooden trough is laid. Porcelain carriers are placed in this trough at intervals of four or five feet, acting as bridge work for support-

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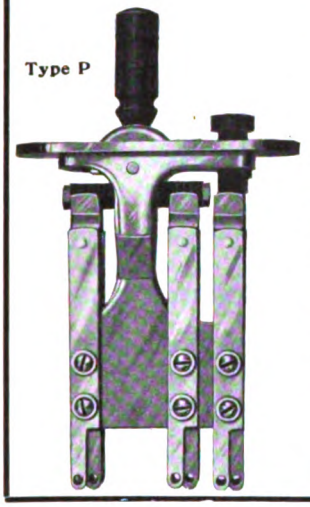

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Frame is a solid piece with nickel-plated top and a lever with black or red rubber handle. Springs are all German silver of the right length and thickness to secure the best effects with pure hard rubber as an insulation. The key has a good action. Contact points are all pure platinum.

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Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three

Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

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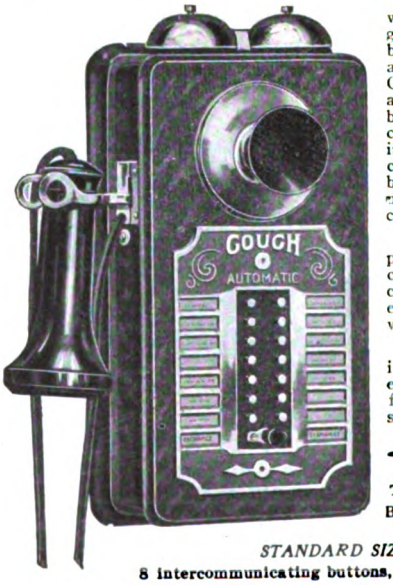

Trunk Button

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will be greatly assisted in getting intercommunicating business if you can refer to an installation equipped with Couch Automatics. Here is an instrument which pleases both the subscriber and the company. A system employing this apparatus is far cheaper to install than a branch exchange, and it is much quicker and more efficient in operation.

The use of trunk buttons places every station in direct communication with the exchange and eliminates the inevitable delays associated with a regular switchboard.

Write for catalogue, which illustrates and describes several different types suitable for any kind of location or service.

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

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ing the conductors. As shown in the perspective sketch, Fig. 2, the bridge work rests on and is surrounded by Voltax impregnated felt or similar material, the space between the carriers after the conductors have been placed in position on them being filled with Voltax which rapidly hardens, thus creating a solid system of insulation throughout the entire conduit.

Connections are easily made by opening the trench at any desired point and melting the Voltax off the conductors by means of a blow torch. After the connection has been made the trough where it had been opened is again filled with the insulating material and the continuity of the insulation of the system thus re-established, perfect connections being secured by this means.

The tests referred to indicate among other things that conductors insulated with Voltax cannot be punctured by currents generated for commercial use, and that they are impervious to atmospheric conditions, water, acid and alkali, thus making this new insulating material particularly desirable for use in connection with the installation of underground conductors. It is noteworthy that with this method the possibilities of conductors attracting stray outside currents is eliminated.

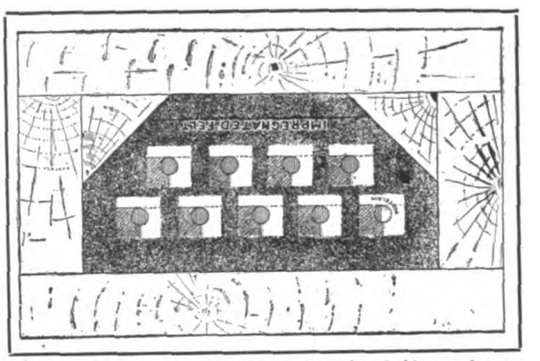

Fig. 3. Cross section of conduit showing bridgework surrounded by Voltax impregnated felt.

Installations made according to the system outlined above are said to involve an outlay of 33 1-3 per cent. less than those which are made according to the duct system, and, it is claimed, will show a greatly superior efficiency in service. The objections still existing in some quarters against the solid system of insulation, based on the ground that it is not possible to increase its capacity as rapidly as that of a system in which the idle duct can be laid, are met by the designers of the system with the argument that a solid system embodying two or three groups of conductors is less expensive to install than a duct system with its cost for annual maintenance and extra ducts.

"Battery Sparks" is the striking title of a 16-page pamphlet describing the Edison primary battery and spark coil for sparking gas engines. The subject is gone into very extensively and figures are given showing the comparative cost of sparking an engine with Edison cells, dry cells and other classes of batteries. The Edison spark coil differs from most of those on the market in being wound with shorter and heavier wire and in transferring a larger proportion of the battery energy to the gas-engine cylinder. It is stated that it is the heat of the spark that fires the engine and not the voltage of the spark, and that the arc drawn out by the contacts of the break and make sparking device is more effective than the thin, high-voltage spark of the jump spark arrangement, besides which there is a great saving in the complication of the apparatus employed.

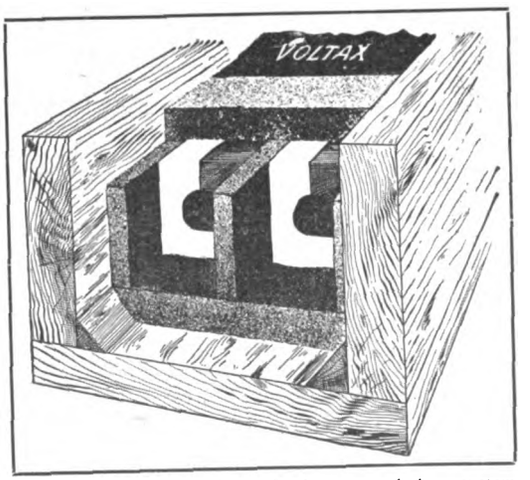

Fig. 2. Perspective view of the transmission system showing layers of impregnated felt surrounding the bridgework, and Voltax backing.

The Century Telephone Construction Company, Buffalo, N. Y., has recently shipped complete material for selective systems to the Williamsville Telephone Company, Williamsville, N. Y.; Bolivar Telephone Company, Bolivar, N. Y.; Killawog Telephone Co., Marathon, N. Y.; Citizens Telephone Company, Allegheny, N. Y., and the Livingstone County Telephone Company, Livonia, N. Y.

The Oliver Manufacturing Company has recently moved its offices to larger and more convenient quarters at 420 Sansom street, Philadelphia, Pa. All inquiries relating to the well-known "Equipoise" telephone arm and other office specialties manufactured by this company should be mailed to the new address.

The French Battery Company has recently removed its entire plant and offices from Chicago to Madison, Wis. It will be pleased to answer all inquiries concerning its new type of high efficiency dry batteries which are received at the new address.

NEXT YEAR'S ELECTRICAL SHOW FOR CHICAGO ALREADY WELL UNDER WAY.

THE coming Independent Telephone Convention, to be held in Chicago, June 27-28-29, at the Auditorium, will find the Electrical Trades Exposition Company well represented. The management intends to promote the interests of this company and its exhibitors in a way that will be appreciated and of much benefit to both. Out of 166 spaces available in the Coliseum, 97 have already been sold.

The 1906 electrical show was the biggest trade show ever held in the Coliseum and exceeded in attendance any affair ever held in the building. Out-of-town attendance was extraordinary and included Independent telephone men from every State in the Union. The second annual show, January 14-26, 1907, will be still larger and better than the first.

The company desires that those who intend to be represented at the next show shall write for a contract at as early a date as possible, in order that their names may appear in printed and other matter to be used at the June convention.

W. H. Crumb & Company, engineers and contractors, of Chicago, Ill., have recently removed their offices to Suite 1041, in the First National Bank Building.

The United States Coin Register Co., Toledo, O., urges that telephone managers give special attention to its pay station, which records all calls. At the same time that the signal bell is struck a mark is printed on the back of a tape numbered from 1 to 2,000. For each division of the tape marked with a number which is not a multiple of ten a dash is printed. Every tenth division is marked with a cross instead of a dash, for convenience in counting, while at every twentieth division the number of the box replaces the dash, in order that a check may be had upon all collections.

The Edwards-Hine Company, 5 and 7 Pearl street, Grand Rapids, Mich., has made arrangements for the preparation of very attractive business cards for Independent telephone men. They bear in the upper left hand corner a shield of just the right size. The live manager who is looking for every possible way to advertise his business would do well to look up this opportunity.

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We Manufacture

Cords for Telephones and Switchboards : : :
Cables and Wires for Switchboards : : :
Cables for Interior Purposes : : : : :

SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

THE CALCULAGRAPH

enables a telephone company to charge for ALL THE EXCESS MINUTES of every toll conversation. It is the only way to do it accurately.

It relieves the service of one of its most serious drags —the work of calculating the time by reference to a clock. Consequently, the efficiency of the service is greatly increased.

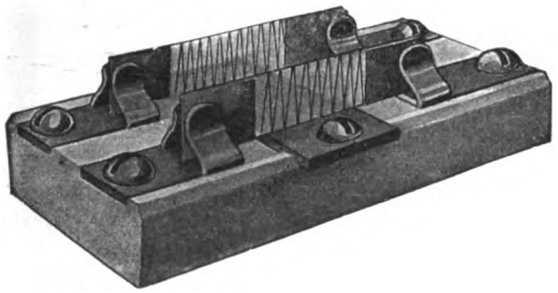
The excess minutes are the profits of your toll line. The Calculagraph makes the profit for you. An operator's eye and pencil and a clock won't do it.

The Calculagraph Makes no Clerical Errors

Send for our booklets---they give valuable data about excess minutes on toll lines

The CALCULAGRAPH CO.

1437 Jewelers Building, NEW YORK CITY



No. 10—S. P. ea. 10c. No. 12—D. P. each 12c.
10% discount in 100 lots.
Gilgen Fuses, copper tipped, per 100, $1.25.

"In my judgment, comparing your fuse block with all others on the market, I can say this much, that I have had such tests with it that I am confident it will protect all telephones, where the block is properly installed, from lightning or any foreign currents that the telephone circuit is liable to come in contact with, and at the same time give the least trouble on that circuit.

I surely would not have placed an order with you for 2,000 of your fuse blocks had I thought there was anything in the market that was equal to it, regardless of what the block might cost."

(Name and address on request.)

Central Telephone & Electric Co.

Makers High Grade Telephone Apparatus

2131-37 Lucas Avenue ST. LOUIS

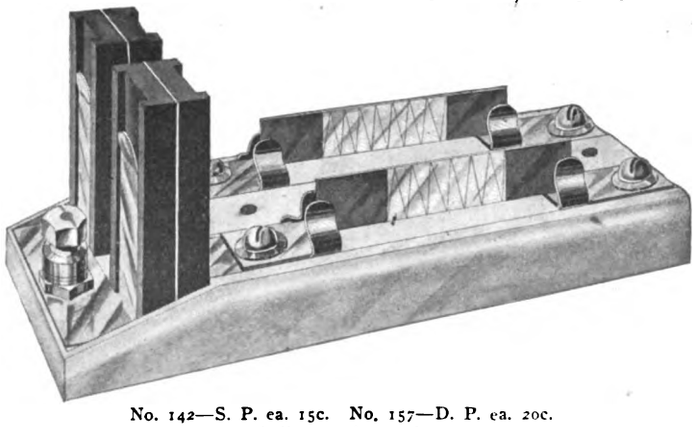
TWICE AS GOOD COST NO MORE

than the ordinary kind—only two of many fuse protective devices we make for the critical trade.

Straight, perfect porcelain
German Silver clips
Special hard, smooth carbon

smaller—neater—better—and when used with Gilgen fuses—perfect.

FREE SAMPLE on request of an operating company.



No. 142—S. P. ea. 15c. No. 157—D. P. ea. 20c.
10% discount in 100 lots.

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THE WEEK'S MESSAGES

FINANCIAL.

SAN FRANCISCO, CAL.—The Home Telephone Company of San Francisco, has presented a bond of $250,000 as a guarantee of good faith that it will spend $4,000,000 on its system.

JEFFERSONVILLE, IND.—The Farmers Union Telephone Company has increased its capital stock from $1,000 to $5,000. The proceeds will be used to make extensions and install new equipment.

ST. PAUL, MINN.—The Twin City Telephone Company has declared its seventeenth quarterly dividend at the rate of 7 per cent. per annum on the preferred capital stock of the company.

PERRYVILLE, MO.—The Perry County Telephone Company has increased its capital stock from $3,100 to $15,000. The company intends to make improvements in its system.

ADAMSVILLE, O.—The Adamsville Telephone Company has increased its capital stock from $3,000 to $10,000, and will make many extensions to its system.

RUSH CREEK, O.—The Rush Creek Telephone Company has increased its capital stock from $5,000 to $10,000.

FRANCHISES.

SKAGWAY, ALASKA.—The Alaska General Electric Company has been granted a franchise to maintain a telephone system at Skagway.

MT. UNION, IA.—The Henry County Telephone Company has applied for a telephone franchise at Mt. Union.

WATERTOWN, N. Y.—The Citizens Telephone Company has been granted permission to construct telephone lines in Watertown.

COLUMBUS GROVE, O.—The Farmers Mutual Telephone Company has applied for a franchise at Columbus Grove.

BARRE, VT.—The Orange County Telephone Company has applied for a franchise at Barre, Vt.

SKAMANIA, WASH.—The Skamania Telephone Company of Skamania, Clarke County, has been granted a franchise.

MOOSEJAW, SASK, CAN.—The Moosejaw Suburban Rapid Transit Company is applying for a charter to include the construction of a telephone system in connection with the railway.

COMBINATIONS.

VINCENNES, IND.—Messrs. Gardner, Morrison & Yoder, of Toledo, O., have sold the controlling stock in the Home Telephone Company, of Vincennes, to the Home Telephone Company, of Louisville.

SARANAC, MICH.—The Citizens Telephone Company has purchased the Saranac Telephone Company's exchange, and will enlarge the system.

PHILADELPHIA, PA.—The Keystone Telephone Company has obtained control of the Eastern Telegraph and Telephone Company, of Camden.

ELECTIONS.

COLUMBUS, IND.—The Citizens' Telephone Company has elected the following officers: George C. Hitt, president; Chas. S. Norton, of Indianapolis, secretary; W. H. G. Butler, general manager.

CASCADE, MONT.—The Cascade County Rural Telephone Company, Cascade, has elected the following officers: President, John Mainland; vice-president, Duncan Cameron; secretary-treasurer, W. F. Kester. Directors: O. H. Parker, Duncan Cameron, J. W. Millegan, W. F. Kester, John Mainland, William Cemmil and H. B. Nevills.

ORD, NEB.—The Ord Telephone Company has elected the following directors: Peter Mortensen, W. W. Haskill, Guy Laverty and T. H. Wheeler.

CATO, N. Y.—The Cato & Meridian Telephone Company has elected the following directors: G. B. Hapeman, John E. Casey, Eugene Soule, James Mehan, L. D. Stafford, J. E. Turner, John K. Rich, G. V. Applegate and Smith D. Ward.

MEDICINE HAT, ALBERTA, CANADA.—The Alberta Southeastern Telephone Company has elected the following officers: President, John Hoaston; vice-president, S. T. Fawcett; secretary-treasurer, W. C. Harris; auditor, H. W. Ireland.

NEW COMPANIES.

LAKE CITY, COL.—The Pittsburgh & Colorado Telephone Company has been incorporated. The company will build a line from Lake City to Animas Forks. The incorporators of the company are D. E. Weir, of Pittsburgh, and W. C. Pitts and W. C. Blair, of Lake City.

SALMON, IDAHO.—The Lemhi Telephone Company has been incorporated. The company will build a line from Salmon to Dubois.

GREENVILLE, ILL.—The Bond County Independent Telephone Company has been organized at Greenville to operate a telephone system in and about Greenville.

MURPHYSBORO, ILL.—The Murphysboro Telephone Company, Murphysboro, has been incorporated with a capital stock of $10,000. The incorporators are: A. B. Minton, Thomas M. Logan and W. C. Alexander.

WEST DOZAN, ILL.—The West Dozan Telephone Company has been incorporated. The incorporators are R. J. Wilson, W. H. Miles and John Fauth.

LETTS, IA.—The Muscatine & Louisa County Telephone Company, of Letts, Louisa County, has been incorporated with a capital stock of $25,000. Directors of the company are: W. W. Wagner, J. H. Letts, Garry Stapp, J. L. Thurston, Chas. N. Johnston, C. Estele, Joseph Meeker, C. A. Carpenter and D. H. Westbrook.

PRESTON, IA.—The Farmers Mutual Telephone Company has been organized at Preston, Ia.

EDNA, KAS.—The Edna Mutual Telephone Company, Edna, Kas., has been incorporated with a capital stock of $5,000.

SHIPTON, KAS.—The Shipton Telephone Company, Shipton, has been incorporated with a capital stock of $3,000.

JEFFERSONVILLE, KY.—The Jeffersonville Telephone Company has been formed at Jeffersonville, Ky. The company has applied for a franchise, and as soon as it is granted will commence the construction of its line. Samuel Castleman, of Louisville, is among the incorporators.

SWEDEN, ME.—The Sweden Telephone Company has been organized with a capital stock of $1,000. President Clarence E. Jones, of Sweden; treasurer, Alvin Pike, of Sweden.

LAWRENCE, MASS.—The Lawrence City Telephone Company has been organized with a capital stock of $90,000. The officers of the company are: President, William C. Ford; vice-president, James S. Conlin; treasurer, Jeremiah J. Desmond; secretary, James E. Simpson.

OAKLAND, MINN.—The Four Corner Telephone Company has been organized at Oakland. The following are the officers: President, John J. Wood; vice-president, Andrew Drydal; secretary, Botolf Bridly; treasurer, Henry Halverson; trustees, O. R. Johnson, Lyman Odstum and Iver Nesby.

LAMAR, MO.—The Missouri Exchange Telephone Company, of Lamar, has been incorporated with a capital stock of $10,000. The incorporators are B. M. Guinney, S. F. Snodgry, Maybelle Guinney, and others.

FALLS CITY, NEB.—The Falls City Telephone Company has been reorganized under the name of the Southeastern Nebraska Telephone Company, with a capital stock of $100,000.

PAGE, NEB.—The Farmers Telephone Company has been organized at Page. The company will build a line to Hainesville.

SMITHFIELD, NEB.—The Smithfield Mutual Telephone Company has been organized with a capital stock of $3,000. The incorporators are C. A. Powell, L. H. Hamlin, Frank Selby, J. M. Crancer, G. C. McDowell, George C. Jenkins, B. B. Sandy, and others.

CLARKSVILLE, N. Y.—The Lake Valley Telephone Company, Clarksville, has been incorporated with a capital stock of $300. The directors are W. H. Van Natten, E. L. Mitchell, Arthur Osterhout, John Swart, New Scotland; A. C. Mosher, Fred Haines, Lester Robinson, Coeymans.

HILLSDALE, N. Y.—E. G. Mercer and Albert Moore are forming a co-operative telephone company to build a line from Hillsdale to connect with Austerlitz and Canaan.

LYONS CORNERS, N. Y.—An Independent Telephone Company has been formed at Lyons Corners. G. C. Douglas is president, and Arthur Thomas, secretary.

OSWEGO, N. Y.—The Southwest Oswego Telephone Company, of Oswego, has been incorporated with a capital stock of $600. The directors are Frank McBride, R. J. Eaton, Percy Flack, George Miller and Myran Green, of Oswego Town. The company will operate lines in Oswego and Cayuga counties.

FLUSHING, O.—The Stillwater Mutual Telephone Company, Flushing, has been incorporated with a capital stock of $10,000. The incorporators are A. J. Murphy, F. A. Groves, J. C. Groves, H. A. Howell and A. W. Collins.

HAMERSVILLE, O.—The Home Telephone Company of Hamersville has been incorporated with a capital stock of $10,000. The incorporators are H. Friedman, Harry McCall, Josiah Hannah, T. G. Lucas and F. S. Park.

MALINTA, O.—The Malinta Mutual Telephone Company, Malinta, has been incorporated with a capital stock of $5,000. The incorporators are

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CHEAP VS. EFFICIENT SERVICE

The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

Standard Construction

requires the use of standard line hardware.

The Norton specialties conform with the most up to date ideas of design and are Standard.

It will cost you nothing to secure a copy of our catalogue and it will be worth a whole lot to you to know just what is considered the best in this particular line.

Patent Combination Messenger Hanger

If you are putting up cable, our **Patent Combination** Messenger Hanger is just the thing. Made from solid forged steel in three sizes for light, medium or heavy work, it is the best on the market. Always in stock either galvanized or japanned.

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ELECTRICAL DEPT.

THE STANDARD "HEMINGRAY"

All With The
"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.
Established 1848

Insulated Electrical Wires and Cables

Bare Steel and Copper Telephone Wire

JOHN A. ROEBLING'S SONS CO.

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THE WEEK'S MESSAGES

J. L. Rentz, P. Heckler, Jr., L. S. Hall, Frank Orthwein, W. M. Decks and Fred Hefflinger.

SCIO, O.—The Doe Run Telephone Company, Scio, has been incorporated with a capital stock of $500. The incorporators are A. N. McCombs, H. W. Henderson, F. S. Edgar, W. B. Turner and W. N. Henderson.

MANGUM, OKLA.—The Mangum Telephone Company has been incorporated with a capital stock of $100,000. The directors are A. Gordon, of Excelsior Springs, Mo.; D. D. Taylor and D. H. Wright, of Mangum.

NEW CASTLE, PA.—The New Castle Telephone & Electric Company, New Castle, Pa., has been organized with a capital stock of $200,000. The following officers were elected: President, William M. White; treasurer, E. E. Duff; secretary, William T. Harrington.

NANSEN, S. D.—The Nansen Telephone Company of Nansen, Miner County, S. D., has been incorporated with a capital stock of $24,000. The incorporators are Carl J. Erickson, C. D. Halvick, Peter Gundahl and A. A. Hender.

MALLARD, TEXAS.—The Mallard Telephone Company, of Mallard, has been incorporated with a capital stock of $8,600. Incorporators are J. D. and G. L. Parr and J. H. Golightly.

BEHLER, W. VA.—The Behler Hogans Telephone Company has been incorporated with a capital stock of $24,000. The incorporators are J. W. Kennedy, Nixon Michael and Norman Cordaw, of Behler, and J. L. Eddy, of Arnettsville.

BARABOO, WIS.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $6,000. The incorporators are Robert Attridge, L. H. Palmer, O. A. Getchell, Edmund Calvert and G. W. Butterfield.

CARNDUFF, SASK., CAN.—A local syndicate has been formed to install a telephone system at Carnduff. Address W. T. Lockhart.

PERSONAL.

H. W. MILLER, of Harrisburg, Pa., has been appointed general auditor of the Union Electric Telephone and Telegraph Company,

SPENCER B. MOSELEY, who was engaged in the construction of the Home Telephone plants at Toledo and Kansas City, is to take charge of the construction of the Home Telephone Company's plant in Detroit, Mich., under the supervision of W. C. Polk, consulting engineer.

J. A. RICHMOND, formerly agent at Vicksburg, Miss., has been appointed local agent for the Southwestern Telegraph and Telephone Company at Beaumont, Tex.

FRANK TURLEY, who has been in charge of the local office of the Pioneer Telephone Company at Shawnee, Okla., in addition to the district having its headquarters at that place, will hereafter devote his entire time to the duties of district manager.

ALBERT W. WOODS, treasurer of the South McAlester-Eufaula Telephone Company, has been appointed district manager, and will have charge of the Bell Telephone exchanges at South McAlester, Wilburton, Eufaula and Tishomingo, I. T.

MISCELLANEOUS.

CAMBRIDGE CITY, IND.—The Citizens' Telephone Company has passed into the possession of J. A. Boyd & Son.

ROCK VALLEY, IA.—Donald McKellar, formerly of Sioux Falls, has taken possession of the Independent Telephone Company at Rock Valley, which he has lately acquired.

CLYDE, Okla.—The incorporators of the Lyle and Clyde Local Telephone Company are E. P. Peters, P. W. Robbins, John Clark, W. A. Devoe, R. E. Conrady, James Salmon and F. P. Privett.

New Construction in the Field

GADSDEN, ALA.—The Independent Telephone Company, which was recently granted a franchise at Gadsden, is to commence the construction of its system in that city. The central and business offices will be located in the Woodliff-Dunlap Building, on the corner of Broad and Fifth streets.

WHITENER, ARK.—The Rural Co-operative Telephone Company, of Whitener, is to construct 226 miles of new line.

BURNSIDE, ILL.—Manning and Steel are putting up a telephone line from Burnside to Webster.

BRAZIL, IND.—The Citizens' Telephone Company has decided to greatly enlarge its plant at Brazil.

LOGANSPORT, IND.—The Logansport Home Telephone Company contemplates installing an exchange at Waverly.

OSGOOD, IND.—The Osgood Telephone Company is to make many improvements in its system.

CEDAR FALLS, IA.—The Hudson Mutual Telephone Company anticipates making many improvements in its system at Cedar Falls.

CORRECTIONVILLE, IA.—The New State Telephone Company, of Odebolt, is to build a line from Correctionville to Carroll, via Ida Grove and Odebolt.

COUNCIL BLUFFS, IA.—The Independent Telephone Company, which has recently installed a new exchange, will spend $50,000 in completing its system.

HEATH, MASS.—The Heath Telephone Company is to build a line to West Hawley.

NEWAYGO, MICH.—The Citizens Telephone Company is to build a line from Newaygo to Croton.

BIRCH LAKE, MINN.—The St. Croix Lumber Company will construct a telephone line to Slate Lake.

DULUTH, MINN.—The Zenith Telephone Company will spend $75,000 in improving its system.

GRANITE FALLS, MINN.—The Granite Falls Telephone Company is to extend its lines to the Yellow Medicine River and to Palmer Creek.

SEDAN, MINN.—The Sedan Telephone Company will soon commence work on its new line.

WEBB CITY, MO.—The Home Telephone Company is to install a new exchange at Webb City.

HELENA, MONTANA.—W. H. Crumb & Company, of Chicago, is to construct an Independent telephone system in Helena.

MISSOULA, MONT.—F. M. Taylor and others contemplate the construction of a telephone line into the Rattlesnake section.

BEATRICE, NEB.—The New Home Telephone Company has under contemplation many improvements in its system.

ITHACA, NEB.—The Golden Rod Telephone Company is building new farm lines in and about Ithaca.

RULO, NEB.—The Farmers' Mutual Telephone Company, Rulo, is to establish an exchange at Falls City.

MILFORD, N. J.—The Delaware Valley Telephone Company is to build a line from Milford to Frenchtown.

ARTESIA, N. M.—The Artesia Telephone Company is to extend its lines to Roswell, Lincoln, Torrance, Willard, Santa Fe and Albuquerque.

DUANESBURG, N. Y.—The Duanesburg & Florida Telephone Association is building a line to connect Delanson with Burtonville.

TRUMBULL CORNERS, N. Y.—The Trumbull Telephone Company is extending its lines into the region of Applegate.

VALOIS, N. Y.—The Valois, Lodi and Caywood Co-operative Telephone Company is building a line from Kidders to Watkins.

CRESTLINE, O.—The United States Long Distance Telephone Company is to establish a switching station at Crestline. This station will be a feeding station for all towns in Central Ohio.

NEWARK, O.—The Newark Telephone Company is to make many improvements in its system, including the providing for 1,000 new telephones.

AVONDALE, PA.—The United Telephone Company, of West Chester, is building a line from Avondale to Landenberg.

FREDERICKSVILLE, PA.—The Mountain Telephone Company will build a telephone line from Fredericksville to Shamrock via Henningsville.

OHIOPYLE, PA.—The Tri-State Telephone Company, of Scranton, is to build a line from Ohiopyle to Somerfield.

PHILADELPHIA, PA.—The Keystone Telephone and Telegraph Company is rebuilding its lines in the vicinity of Trowbridge.

HOPE VALLEY, R. I.—The Hope Valley Telephone Company is to extend its lines to Canonchet.

CANTON, S. D.—The Canton Co-Operative Telephone Company is to make many improvements in its city system, and is also to build a line to Klondike, Iowa.

ELKHORN, WIS.—The County Telephone Company, of Elkhorn, is to build a line between Springfield and Elkhorn and from Spring Prairie to Elkhorn.

FORT WILLIAM, ONT., CAN.—Superintendent Jones has been instructed to prepare plans for a new municipal telephone building. The station will have a capacity of 5,000 lines. Several extensions of lines will also be made.

PETERBORO, ONT., CAN.—The Machine Telephone Company is to build long distance lines to Smith, Duoro, North Monaghan and Otonabee municipalities, and to build connecting rural lines.

PORT ARTHUR, ONT., CAN.—The council is considering the building of a long distance line to Hymers, connecting it with the town's municipal system. Address Mayor Clavet.

SASKATOON, SASK., CAN.—The Saskatchewan and Electrical Supply Company of Saskatoon will extend its switchboard by 300 lines and in other ways improve its system.

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KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

We have recently published a little book giving some very valuable information about Cedar Poles. It contains Specifications, Inspection Comments, Shipping Data, Etc. "Yours for the asking."

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Manufacturers of

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WE GALVANIZE BY THE HOT PROCESS

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MICHIGAN AND IDAHO CEDAR

POLES

THE F. BISSELL COMPANY. TOLEDO, OHIO.

CHESTNUT POLES

J. I. M. WILSON COMPANY

Wholesale Producers

Bessemer Building PITTSBURG, PA.

POLES and PILING

POLES

30 and 35 foot lengths for rural telephone lines a specialty.

PORTER CEDAR CO., Saginaw, Mich.

WHITE CEDAR POLES

Buy from the Producers and Save Jobbers' Profits.

PENDLETON & GILKEY - Minneapolis, Minn.

We Make a Specialty of Telephone Poles.

Large Stock 16 to 25 ft. 3 to 6 in. Tops For Rural Lines

POLES

YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.

FRANCIS BEIDLER & CO.
459-519 W 22d St.
CHICAGO, ILL.

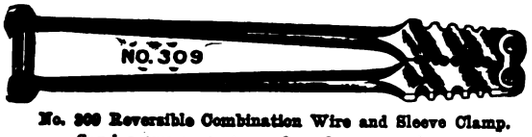
WHITE CEDAR POLES

Longest Lasting Best Grade

40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st
25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

Yards { Omer, Bay City and Boyne Falls

W. C. Sterling & Son Co., Monroe, Mich.



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"HIGH-DUTY"
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Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
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Write for Sample Forms and Prices.
THE TELEPHONE PRINTING CO.
DEFIANCE, OHIO

Experts in Underground Conduit Subway Construction
THE BUTTERFIELD CONSTRUCTION CO.,
326 Reaper Block, Chicago.

HANS CONSTRUCTION CO.
ELECTRICAL ENGINEERS
Complete Telephone Exchanges Built and Material Furnished.
Cable Construction and Underground Conduit Construction a Specialty.
88 and 90 LA SALLE STREET
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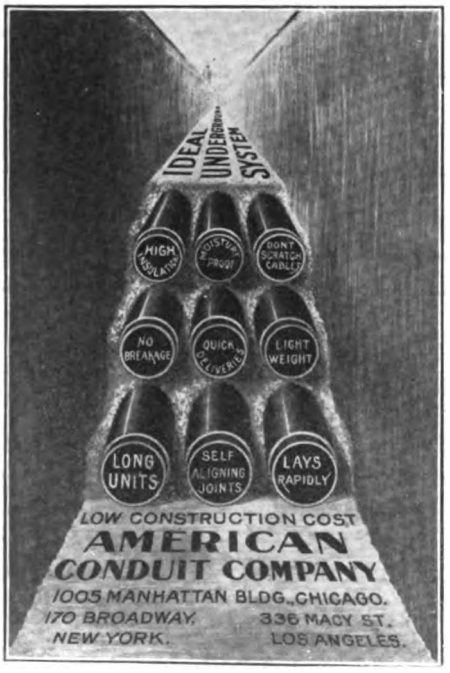
STANDARD PORTABLE DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milliammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.
Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.
WESTON ELECTRICAL INSTRUMENT CO.
Main Office and Works, Waverly Park, NEWARK, N. J.
London Branch—Audrey House, Ely Place, Holborn.
Paris, France—H. H. Cadiot, 12 Rue St. Georges.
Berlin—European Weston Electrical Inst. Co., Ritterstrasse, No. 88.
New York Office—74 Cortlandt Street.

Weston Standard Portable Direct Reading Voltmeter.

WATERING a lawn once won't keep it green the rest of the year. Advertising once won't make any noticeable difference in the annual profits.—*Judicious Advertising.*

HAWKINS, W. W.
CONSULTING AND CONTRACTING TELEPHONE ENGINEER
Plans and Specifications for Complete Telephone Equipments. Existing Plants Remodelled.
Private Branch Exchanges Installed. Engineer for
WILLIAMS TELEPHONE & SUPPLY CO.
No. 79 CENTRAL AVENUE, CLEVELAND, OHIO



SAMUEL G. McMEEN KEMPSTER B. MILLER
McMEEN & MILLER
ENGINEERS: CONSTRUCTORS
Telephone and Telegraph Properties
MONADNOCK BLOCK CHICAGO

TELEPHONE & TELEGRAPH WIRE
HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
—MADE IN THREE GRADES—
"EXTRA BEST BEST" (E.B.B.). "BEST, BEST" (B.B.). "STEEL"
INDIANA STEEL & WIRE CO. MUNCIE, INDIANA

We make any kind of an electric sign, either with the lamps exposed or concealed behind the letters.
HALLER MACHINE CO., 129 Fulton St., Chicago

OKONITE
TRADE MARK
REG. U.S. PATENT OFFICE.
1889—Paris Exposition Medal for Rubber Insulation 1893—World's Fair Medal for Rubber Insulation
The Standard for Rubber Insulation
Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire
THE OKONITE CO., Ltd., 253 Broadway, New York
Sole Manufacturers
WILLARD L. CANDEE, H. DURANT CHEEVER, } Managers
GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

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Actual size, 2¾ x 1¾ inches, including terminal clips.

"X-P CONDENSERS"

WILL HELP INCREASE YOUR SUBSCRIBERS

By installing them in your bridging telephones you improve the service. Better send us a trial order.

Electric Appliance Company, Telephone Manufacturers

134-136-138-140 West Jackson Boulevard, CHICAGO

Branches { SAN FRANCISCO 717-719 Mission Street; DALLAS 418 Main Street; NEW ORLEANS 139-141 Chartres Street

ANNOUNCEMENT

We have recently organized a Telephone Battery Department and have engaged a corps of experienced engineers who will devote their entire attention to the Storage Battery as applied to Telephone work.

We will be pleased to survey your plant and submit a detailed report and estimate of the cost and advantages of installing a Storage Battery to meet your conditions.

ALL INQUIRIES WILL HAVE OUR CAREFUL ATTENTION

SALES OFFICES
BOSTON—89 State St.
CHICAGO—Rookery Bldg.
SAN FRANCISCO—Crossley Bldg.

Gould Storage Battery Co.

MAIN OFFICES
1 West 34th St.,
New York City.
WORKS, DEPEW, N. Y.

Lower Prices on Condensers

Here's a chance to save money on condensers and improve your service.

Iron Box Condenser
No. 300

Save in 2 ways.
Lower price on the condensers.
Less time used in installing them.

All the tools needed are:
1 screwdriver,
2 screws, and
3 minutes time.

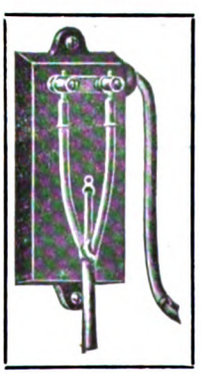
That's how these condensers shown in the cuts are put in, also our No. 186.

On party lines they are as essential to perfect service as the current itself.
No trouble from other receivers being off the hooks if you use a condenser.
You can talk just the same.
No one but the party you are speaking with can hear you.

Just to show you how they improve the service, we'll equip your line with our condensers *Free of Charge*. Use them 30 days. If they are all we claim send us the price, or, if you don't like them send them back—we'll pay the freight.

Better send for our new circular.
The prices in it are lower than in the old ones.

Iron Box Condenser
No. 301



Julius Andrae & Sons Co.

99 West Water Street **Milwaukee, Wis.**

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W. H. CRUMB & COMPANY

Engineers Contractors

TELEPHONE ENGINEERING and CONSTRUCTION

Plans, Specifications and Estimates Promptly Furnished

MERITORIOUS INDEPENDENT TELEPHONE ENTERPRISES FINANCED

1263 Monadnock Bldg., CHICAGO, ILL.

BELDEN JUMPER WIRE

is a tinned copper conductor, insulated with single or double silk wrapping and one outside cotton braid.

STANDARD COLORS

RED WHITE BLUE

Made single or duplex conductors and saturated with bee's-wax compound or treated with BELDEN flame-proofing solution.

For further particulars write to

BELDEN MANUFACTURING COMPANY

194 MICHIGAN STREET

CHICAGO

ANNOUNCEMENT

Owing to the great growth of our business in the Central West and the increasing demand from our customers for a nearby base of supply, we have opened a warehouse and salesrooms at

KANSAS CITY, MO., 317-319 South West Boulevard

Our Standard Instruments will be shipped from our factory in car load lots. We will carry a full line of our equipment, and will be in position to fill orders much more quickly than if shipped from Cleveland direct.

We will also carry a complete stock of construction material and tools.

Our Kansas City branch will be open for business on and after May 12th.

You are cordially invited to call and inspect our apparatus.

The North Electric Company

KANSAS CITY CLEVELAND DALLAS

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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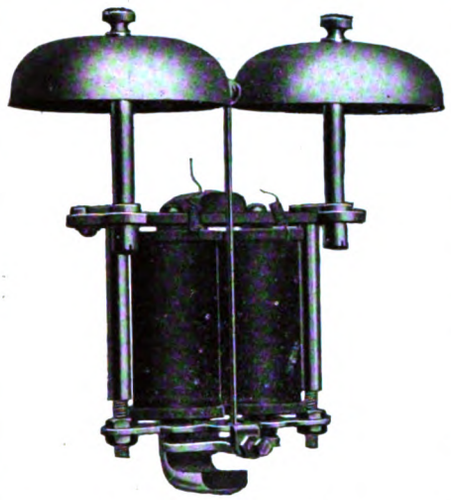
CENTURY
100 % GOOD



No. 56 Ringer Movement

This ringer is of the self-contained type, in which the gongs attach to posts fastened direct to the ringer frame instead of fastening to the cabinet. These posts are adjustable either with use of screw-driver or wrench.

Gongs are always in adjustment --- a small guard protects the tapper from being injured.

The ringer armature is adjustable and will not freeze or stick to the pole pieces.

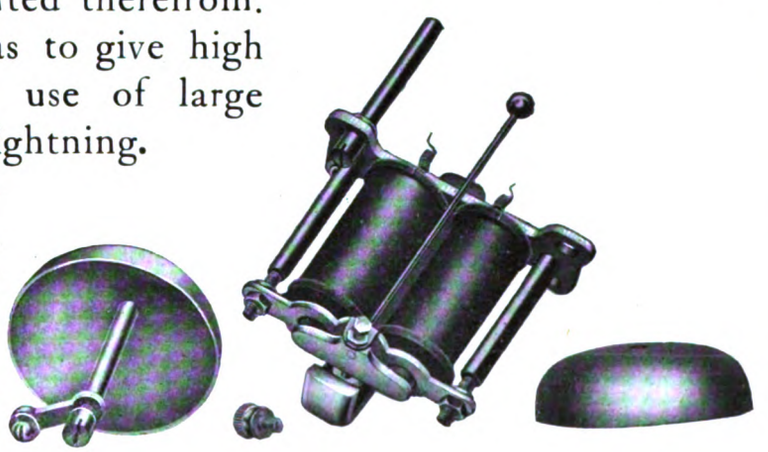
The coils are wound with silk insulated copper wire on soft Norway iron cores and carefully insulated therefrom.

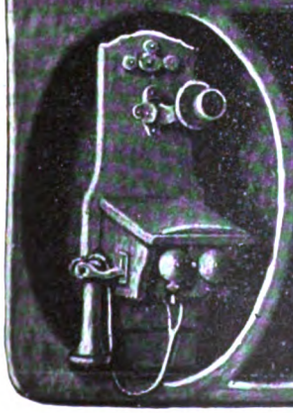
Ringer coils are long so as to give high retardation and permit the use of large wire preventing injury from lightning.

This ringer is perfectly balanced and exceedingly sensitive.

Used on all CENTURY Telephones.

We make local and common battery telephone apparatus.





CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

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DEPARTMENT OF THE INTERIOR
UNITED STATES PATENT OFFICE
WASHINGTON, D. C.

April 18, 1906.

FRANK B. COOK, 240 West Lake street, Chicago, Ill.

Dear Sir:—Replying to your favor of the 8th inst. An examination of the U. S. Patent Office records show that you are the owner of the entire right, title and interest in each and every one of the following 34 patents.

There is no record of your having assigned any of these patents, nor is there any record of an injunction or any other court proceedings which affects your absolute right and title to same.

Very respectfully,

Jos. T. Allen

	Pat. No	Date of Issue	Title	No. of Claims	Pat. will Expire
1	817,160	Apr. 10, 1906	Heat Coil (Self-Soldering Heat Coil.)	30	1923
2	816,847	Apr. 3, 1906	Iron Frame Distributing Board (Type L Distributing Frame.)	18	1923
3	815,406	Mar. 20, 1906	Auto. Electrical Self-Soldering Reset (No. 10 Protector.)	40	1923
4	815,006	Mar. 13, 1906	Thermal Protector and Alarm (Cook Type No. 4 Protector.)	18	1923
5	812,980	Feb. 20, 1906	Self-Soldering Heat Cartridge and Protective Apparatus (Cook Type Kaisling Protector.)	17	1923
6	812,184	Feb. 13, 1906	Thermal Protector and Alarm (Sterling Type No. 4 Protector.)	14	1923
7	810,914	Jan. 30, 1906	Protective Apparatus (No. 444 Protector.)	21	1923
8	803,881	Nov. 7, 1905	Self-Soldering Protector.	12	1922
9	802,939	Oct. 24, 1905	Ground Plate for Electric Protective Apparatus (Mounting Plate for Protectors.)	8	1922
10	802,736	Oct. 24, 1905	Electric Fuse (Type Q Fuse and Mounts.)	10	1922
11	802,684	Oct. 24, 1905	Heat Coil. (No. 4 Heat Coil.)	1	1922
12	802,497	Oct. 24, 1905	Ground Strip for Protective Apparatus (Ground Strip for Protector Mounting Plate.)	13	1922
13	796,297	Aug. 1, 1905	Auto. Restoring Thermal Protector	7	1922
14	795,197	July 18, 1905	Self-Soldering Protective Apparatus (No. 8 Protector.)	16	1922
15	793,802	July 4, 1905	Electric Protective Apparatus (No. 8 Protector, Testing.)	42	1922
16	792,315	June 13, 1905	Self-Soldering Heat Coil (No. 8 Heat Coil.)	6	1922
17	788,130	Apr. 25, 1905	Cable Head and Pole House (Type S Cable Terminals.)	17	1922
18	786,005	Mar. 28, 1905	Elec. Prot'or Apparatus. (No. 44 Protector and Heat Coil.)	16	1922
19	785,798	Mar. 28, 1905	Self-Sold'ing Heat Coil.	37	1922
20	785,797	Mar. 28, 1905	Thermal Cut-Out for Electrical Circuits (Self-Soldering Protector.)	21	1922
21	785,407	Mar. 21, 1905	Self-Sold'ing Heat Coil. (Cook's Rolfe Type Protector.)	12	1922
22	783,995	Feb. 28, 1905	Test Plug for Protective Apparatus (Broad Test Plug Patent.)	37	1922
23	776,218	Nov. 29, 1904	Self-Sold'ing Heat Coil. (Nos. 8 and 444 Heat Coils.)	20	1921
24	774,160	Nov. 8, 1904	Self-Soldering Protector.	18	1921
25	774,159	Nov. 8, 1904	Cross Arm Brace	5	1921
26	774,158	Nov. 8, 1904	Protective Device for Electrical Circuits (Type B-4 Substation Protector.)	10	1921
27	767,437	Aug. 16, 1904	Self-Sold'ing Fuse Post. (Self-Soldering Protector.)	3	1921
28	752,655	Feb. 23, 1904	Cross Arm Brace	14	1921
29	740,744	Oct. 6, 1903	Polarized Electric Bell	4	1920
30	711,921	Oct. 21, 1902	Fuse (Types A and D Tubular Line Fuses.)	13	1919
31	699,660	May 13, 1902	Polarized Electromagnetic Apparatus	5	1919
32	658,976	Oct. 2, 1900	Lightning Arrester	3	1917
33	639,528	Dec. 19, 1899	Telephone Transfer Board	9	1916
34	451,933	May 12, 1891	Coupling for Elec. Wires (Self-Welding Wire Joint.)	3	1908

Explanation in parenthesis ( ) not in original letter.

AUTOMATIC INTERCOMMUNICATING 'PHONE for EXCHANGE CONNECTION

For factories, business houses, residences, hospitals, etc. A complete non-interfering, inter-communicating system with trunk button for direct exchange connection at each station. Instantaneous connection with city central from any station by pushing down trunk button. Can be equipped with one, two three or more exchange buttons. Absolutely reliable. Used and endorsed by the largest exchanges.

Much cheaper and more satisfactory than a small branch switchboard. Write for particulars and prices.

Send for Bulletin "T"

CONNECTICUT TELEPHONE & ELECTRIC CO., Inc., Meriden, Conn. U. S. A.

Over 12 years' experience

BATTERY TROUBLE IN A TELEPHONE—

Like the notorious straw that broke the camel's back, is a little thing by itself, but it kills and renders useless the whole system.

And it is just one's luck for the break down to come at an important moment when delay is costly.

The "1900" dry battery is "tailor-made" to ring bells—telephone and door. It is as near perfection as it is possible to make it. It is inspected at every stage of its making.

The "1900" represents 18 years of dry battery experiment and experience.

Stromberg-Carlson Telephone Mfg. Co.
ROCHESTER, N. Y.

General Offices, Rochester, N. Y.
Branch Sales Office, Chicago, Ill.

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DEAN TELEPHONE APPARATUS

OUR PORTABLE DESK STAND

is a radical departure from the time-honored and inefficient method of construction. It is made in the most substantial manner possible, the inner framework being pressed and drawn from heavy sheet steel instead of the usual castings. The external design is along graceful and simple lines, while the finish is beautiful and lasting.

The upright is covered with a thick and highly polished hard rubber tube, and all of the remaining exposed portions are heavily nickel plated.

The contact springs of the hook switch are mounted edgewise within the base so that the platinum contact points are open for inspection by simply removing the base cover, the latter being fastened by a simple lock.

One of the new features incorporated in our desk stand which makes the instrument of double value is the interchangeable plate.

All of the talking circuit apparatus excepting the transmitter and receiver is mounted on a metal plate and completely wired so as to form a unit.

These units are interchangeable and are arranged for local and common battery circuits.

Thus an exchange using our local battery desk sets, and wishing to change their system to a common battery require only the changing of the circuit plate.

Ask for our Folder No. 2A, which gives full description and circuits.

BRANCH SALES OFFICES

511 Kansas City Life Building
Kansas City, Mo.

542 Byrne Building
Los Angeles, Calif.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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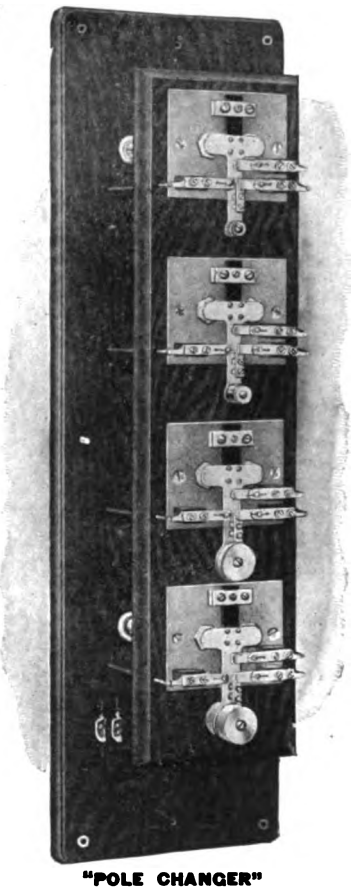
KELLOGG PHILOSOPHY ——— THE BEST IS THE CHEAPEST

KELLOGG

FREQUENCY POLE CHANGER

Utmost SIMPLICITY of operation

THIS POLE CHANGER can be used on common battery or magneto exchanges.



"POLE CHANGER" COVER REMOVED

Advantages:

1. Requires no attention once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from primary or storage batteries.
4. Dry cells can be used for the ringing current.
5. They can be used to work successfully under any load.
6. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
7. Operates successfully within the limits of 19 to 27 volts.
8. Practically wireless in operation.
9. Only three contacts on each Vibrator.

THE TRANSFORMER CABINET contains all necessary Switches, Fuses, etc.
Pole changer cabinet and transformer cabinet separate.
Can be put in different rooms if desired.
Sold separately or complete.
No additional apparatus needed on power board already installed.

TRANSFORMER CABINET

Send for Folder No. 1 *Correspondence Solicited*

KELLOGG SWITCHBOARD & SUPPLY CO.,

Congress and Green Sts. CHICAGO, ILL.

BRANCH OFFICES:

CLEVELAND, OHIO
Electric Bldg.

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116 Nassau St.

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Drive and Twist

Points of Superiority

Found only in the

D. & T. Anchor

Immense strength

Pulls on solid dirt

Cannot be moved by any direct strain

Easily set in one minute without the use of special tools

Write for Booklet

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

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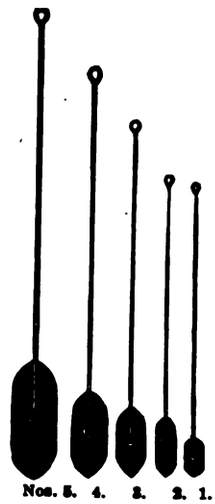

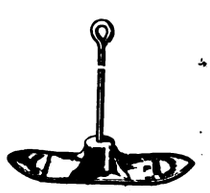

Made of Malleable Iron in Five Sizes

No. 1—	Rod	½" x 6'	Plate	5" x 10"
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No. 3—	"	¾" x 7'	"	8" x 18"
No. 4—	"	1 " x 8'	"	10" x 22"
No. 5—	"	1¼" x 9'	"	12" x 30"

We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

TOLEDO, O.

COMBINED

Cash Register and Pay Station

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

No Disputes,

No Trouble.

It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE United States Coin Register Co.

TOLEDO, OHIO

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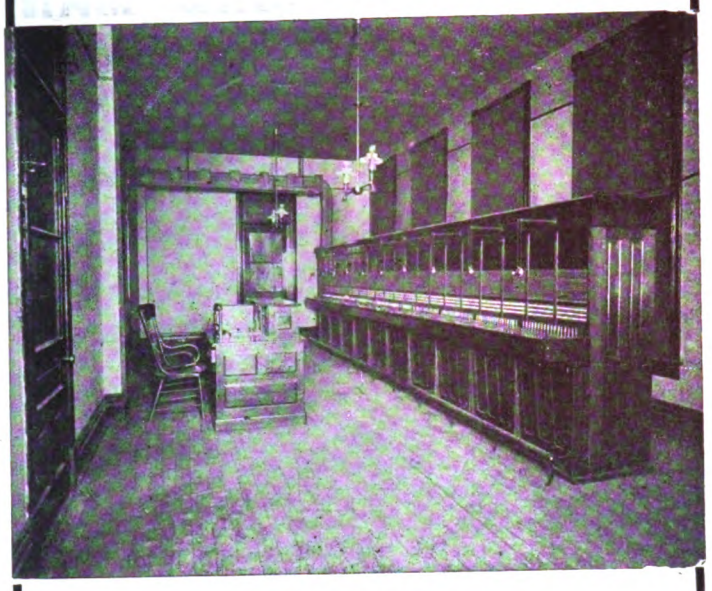

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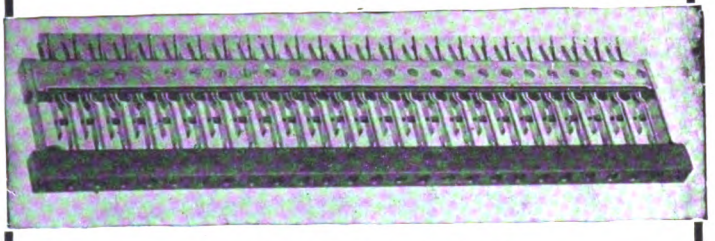

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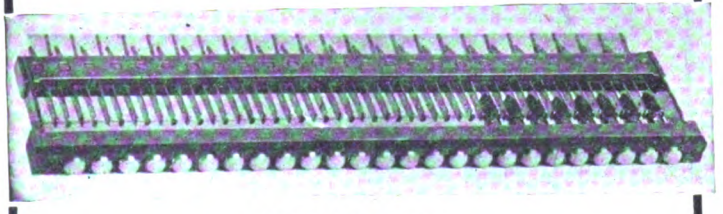


LAMP JACK STRIP

COMMON BATTERY RELAY

STERLING ELECTRIC CO.
LAFAYETTE, IND.

SECURITY, CONVENIENCE, SAFETY AND ECONOMY

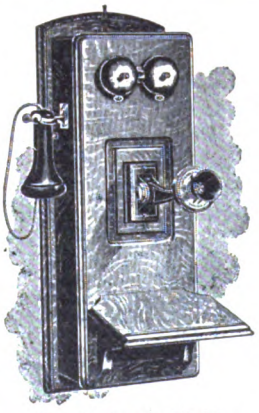
SECURITY POLE SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.
Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton.
You will be pleased on investigation.

Novelty Potheads and Sleeves

Made of selected brass. No expert plumber needed to fit head or sleeve. Always ready for inspection or removal. Waterproof after inspection same as before. Samples sent on trial.
Complete information and blanks for ordering, upon request.

TOLEDO, OHIO · THE F. BISSELL COMPANY

THE F. BISSELL COMPANY,
TOLEDO, O.



Our Price Is Right

1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

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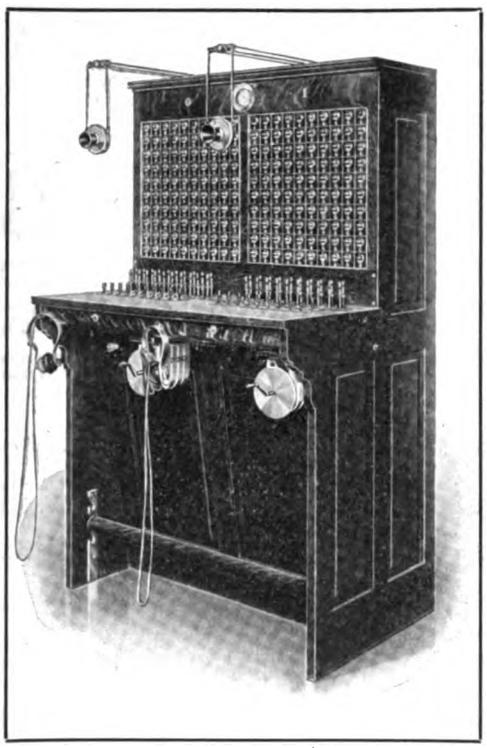

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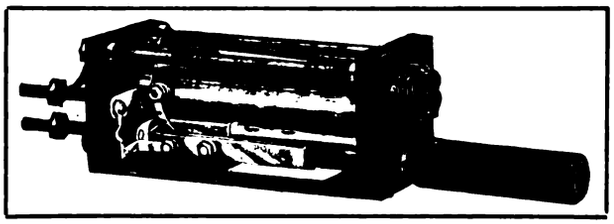

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Figures may perhaps interest you because they tell their story briefly and to the point. Those below were furnished by one of the best known construction men in the business, Mr. Frank B. Hall, of Wheeling, W. Va. Mr. Hall knows the cable construction business from A to Z and back again. He has laid out and superintended the construction of some of the largest and most successful systems in the country, notably those of the National Telephone Company of Wheeling, W. Va., and the Utah Independent Company at Salt Lake City. Besides this work he has had charge of the cable construction for thirty-one different Independent systems. The figures were taken from the trouble records of the National Telephone Company of Wheeling.

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Oct. 13	1	4	4	22
Nov. 15		7		22
Dec. 22	1	5	1	29
Jan. 27	3	5	1	46
Feb. 24		3		27
Total 127	7	25	6	165

FRANK B. HALL

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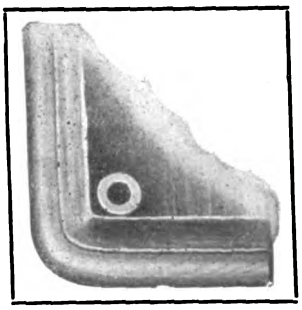

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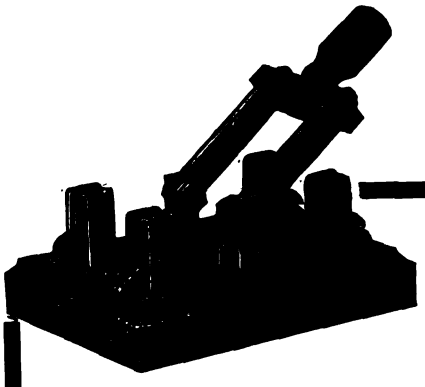

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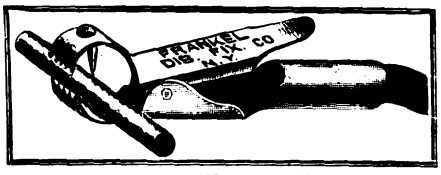

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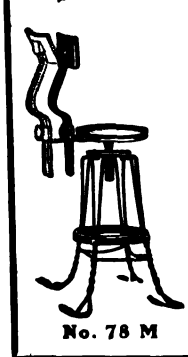

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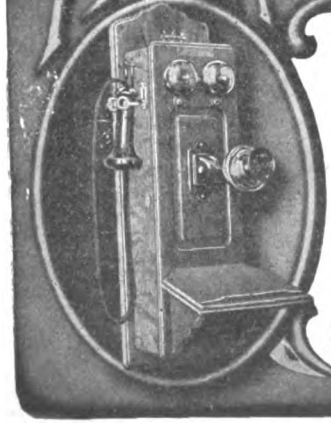

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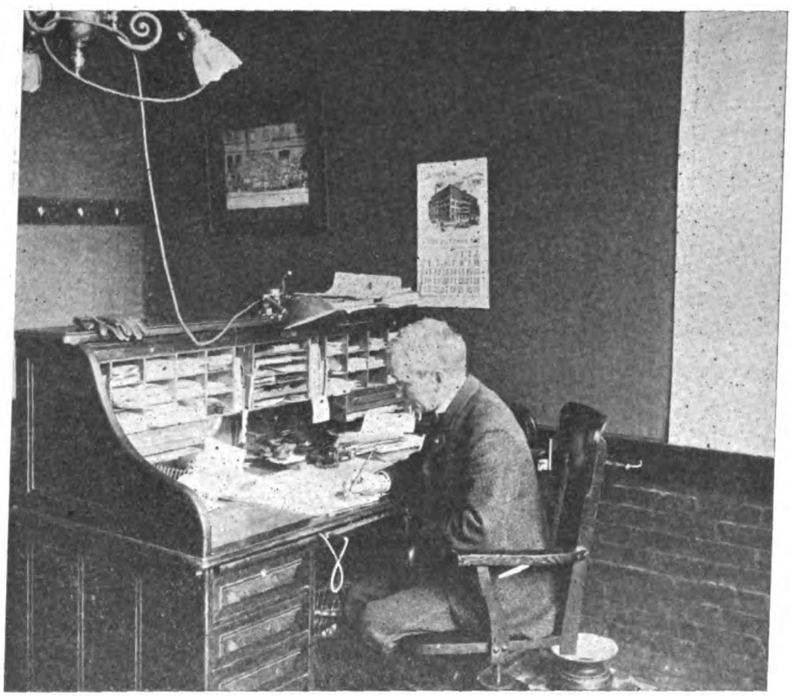
Organization in Telephone Work

By P. Kerr Higgins.

THERE can be but "one best way" in which to do anything. Nevertheless, it is apparent to all that no definite set of rules nor methods will apply to all conditions. The best which can be accomplished then is the establishment of some standard method which each individual may be enabled to use as a skeleton for the particular system which will satisfy his necessities.

It is a true saying, and good common sense, that the only way in which we can fully apprehend anything is by getting in and doing it. It is often said: "If you want anything done, ask someone to do it, but if you want it done right, do it yourself." These simple, homely statements furnish the whole key to the method of building up an organization capable of actively and economically conducting a telephone system.

The basic principles must be understood before one can hope to apply them; one must enter prepared with these before he can hope to improve them. The conditions which govern the purpose and control the form of the average organization seem to be about as follows: Facts and figures are necessary to show results; means for comparison of co-ordinate departments must be provided; interchecking must be arranged for in such a way as to indicate both the presence and means for avoiding all leaks and losses; complex, scattered units of work must be accomplished with the least drain upon the combined energy of the entire body. These business requirements are fundamental and it is because it enables them to be fulfilled to as near completion, and with as little waste as possible, that the following has come to be an approved form of organization.



George R. Fuller, General Manager of the Rochester (N. Y.) Telephone Company, Who is at the Head of a Large and Extremely Efficient Group of Telephone Men.

The stockholders who are the owners of the property, and to whom all responsibility is due, elect a board of directors. They also sometimes choose by direct vote, and sometimes indirectly through the directors who are their representatives, a president, vice-president, a secretary and a treasurer. The board of directors defines the policy of the company and elects an executive committee (with the president as chairman), who act as an advisory committee on the policy of the company. The directors also choose an auditor, who audits the books of the company. The function of the executive committee is principally operative, that of the auditor financial. In touch with both of these is the general manager. The treasurer has access at all times to, and is in direct touch with, the accounting department. The secretary has access to all records of any department. Both of these officers report directly to the board of directors and represent them in a checking capacity, as does also the auditor. It will be seen from the chart presented with this article that the positions of general manager and assistant general manager derive their great importance from the fact that these officials are practically at the head of each and every department, so that in case of removal, sickness, death or other causes they should be qualified to fill the vacancy.

If one of the divisions under the assistant general manager should lose its head for any reason, then the assistant general manager would step in until a new chief could be appointed. This means that the assistant must combine in himself all the powers and qualifications of those looking to him for instructions.

In the same way the general manager must be the superior of the assistant and all other officials, although not of necessity knowing all the technical detail at the command of the assistant, he must know enough of it to be able to intelligently examine and correctly pass upon the reports of his subordinates. He must, however, be an organizer, an expert accountant and a financier.

The weakness of an organization can be easily discovered at any time by the board of directors through the employment of a technical telephone expert and an expert accountant to inspect and review the plant with a view to determining its valuation in case the plant were to be sold. The amount represented by the original cost less the depreciation should equal its present valuation. The report of the experts should correspond closely on these figures, without any previous knowledge on their part of its probable amount. Any variation beyond the normal possibilities of error in estimation would show loss or gain, and good or poor judgment on the part of the administration.

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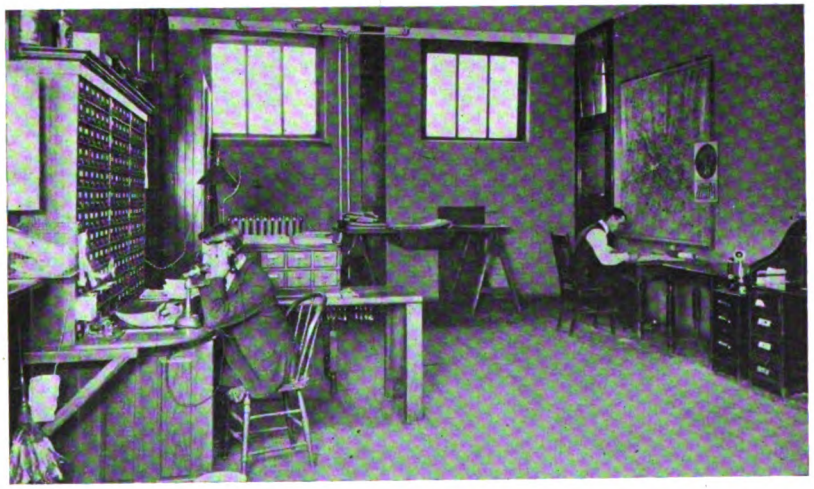
It will be acknowledged that any plant, large or small, must be run scientifically in order to accomplish results, and every subordinate or employee in the organization must do his or her work on a scientific basis. Every move must be directed and guided by a master hand and each moment properly accounted for. It has been the writer's experience that some telephone managers, like the electricity they use and sell, seek a path along the line of least resistance; but think for a moment what would become of the telephone business, or any electrical business, if such were permitted in every day practice. The one thing we aim at is to direct and confine the electric current into useful channels and prevent its leaking to ground until its work is fully and completely finished In the same way must every scientific manager direct the forces under him into useful and profitable channels, permitting no leak in his well insulated system.

The combining of departments may be advantageous, and even necessary, in smaller exchanges, but in no case must the head be overloaded. Heads of departments, and especially foremen, make the great mistake of trying to do too much of the work themselves and using too cheap labor for the remainder. This often appears to be an indication of lack of executive ability. The chief must be in a position at all times to take in the whole field under his charge in an unprejudiced manner and free to direct and instruct its units. While the directors or executive committee outline the plan of campaign, they must have enough confidence in the ability of the one they place in charge to permit him to get the results in his own way. If the results expected are not forthcoming then it is time enough for them to interfere; if done previously they take from the manager his individuality and his initiative and so paralyze his best efforts.



Typical Arrangement for an Installation Office, Showing Quarters for the Department Head and the Stock Clerk.

As an example of what can be done along this line of following up the work of the departments without any special effort, an actual incident is worth relating. The writer knows of an exchange where there is on its system over 25,000 feet of insulated duplex wire not now in use and likely to never be in service. Some of it is outside, but the greater portion is inside of buildings. He has seen complete cross-arms, bolts, half keys of insulators, etc., lying in out of the way places where they have been for at least a year and evidently the fact was not known to any high official of the company. This suggests the advisability of having a material inspector.

The requirements of a general plan of organization involve two elements of primary importance. These are the definite fixing of responsibility upon the members of the force and the division of the work according to some classification based upon the nature of the work itself. It was for a long time a rather general practice to give the direction of many unrelated things at the same time to a trustworthy and intelligent subordinate. A good man was loaded according to his capacity, and if not enough work of the sort to which he was most accustomed could be found on the instant, a new line was laid upon him.

While this may work fairly well in a small company, with a man of extraordinary capability, it has a most demoralizing influence in a large field. The man who is given the direction of work in numerous departments will almost invariably carry out to a lesser degree the principle which is forced upon him from above, and take to the extraordinary work some of the men usually engaged upon the routine of his regular department.

When this practice is applied to the less efficient members of an organization, it usually causes a considerable amount of confusion. There is a certain inertia which must be overcome whenever a new task is commenced, and it takes time for the person engaged upon the work to acquire a knowledge of the means for handling it to the best advantage. Even after the general method is acquired, he is still far away from attaining the maximum of efficiency. It is the same in almost any line of work that it is in handling small pieces of material in a machine shop; it is the practised hand which accomplishes the most in the course of a day.

In so far as this reasoning is generally applicable, it also points to the advantages to be attained from the concentration of the thought of even the most capable members of the organization on the upbuliding of at least closely related lines of the business. While a change from one class of work to another will enable more energy to be expended without unduly wearing upon the official it should always be borne in mind that whatever variation is introduced should be, to a considerable degree, systematic. Even when the present affords an interval of comparative freedom from routine in some department the future must always be cared for. There are always minor improvements to be made in every branch, and plans laid for enlargement which can be best conceived by those who are thoroughly familiar with all the conditions which will probably be effective when the plans are put in operation.

For these reasons a careful adherence to departmental lines has been found to work out to the ultimate advantage of the company, even when exceptional men were present. Observance of the boundaries established gives a definite form to all endeavor, which enables the individuals in a lower place to have exact and permanent ideas of the progress which can be made by them individually; and up to a certain point this is agreeable to the average man. In a measure it aids the person who needs to be led.

The accompanying chart represents what have come to be acknowledged as the broad divisions into which the elements of a successful force for conducting the affairs of a telephone company must be organized. While all of the various departments report to the general manager, each one concerns itself with a class of work in which all knowledge is closely related, and each day's experience is likely to be of direct and immediate value in increasing the efficiency of the work done in the future.

It will be observed that the broadest distinction is made between the business and technical branches of the work, corresponding to the great differences in temperament and experience which exist in the types of employees competent to obtain employment in these respective branches. Such an organization promotes economy of management to a high degree.

The chief of each division has under his direction a force competent to handle all business of the class which is directly under his control. As the work of one day differs only in detail from that of the next, as far as the subordinate members of the organization are concerned, everything goes along smoothly. When any task comes up to a man he knows just how to handle it, without spending a great amount of time in looking about to

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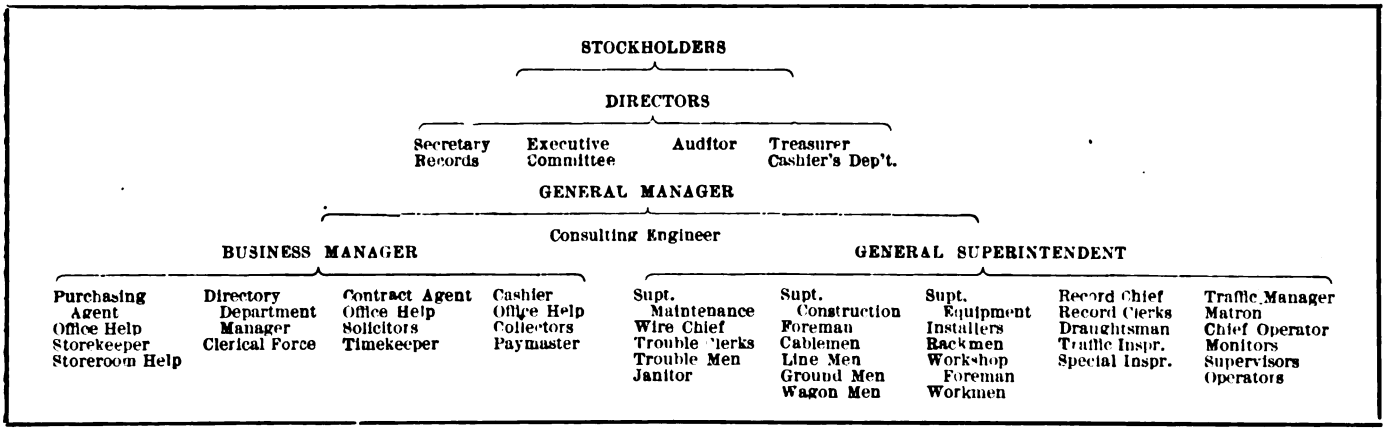
see how it was done the last time, perhaps by a man who is nowhere to be found.

Moreover, while each has the advantage of knowledge concerning many matters which come up, owing to their being of a nature which permits him to bring his past experience directly to bear on present problems, he has the still further advantage of knowing exactly what to do with matters which are beyond his experience, or which require to be considered in connection with figures or data which are not within his immediate reach. Although he may not know exactly where the information he desires may be obtained, he does know in what class it lies. This is sufficient to show him to what department he must put his questions, and if that department is efficient the mere reference to its head causes the matter to be as good as settled, and without any loss of valuable time.

While these matters are perfectly familiar to many who have contemplated them it is a fact that there is a continual shifting about which tends to interrupt the strictness of routine and bring about more or less of confusion, and this is not capable of being completely avoided in any company. It would therefore appear that the success or failure of an organization largely depends upon its systematic construction. Precautionary methods should be adopted, and possible difficulties that may arise in the future anticipated, and in a measure provided for.



Typical Chart Showing the Organization of the Forces of a Large Telephone Company. Authority on all Matters is Definitely Fixed in the Official Who Should be Best Qualified to Handle Them Under Such a Settled Plan.

Report of John Hesketh*

EFFICIENT management in telephone systems is as essential as good engineering. It is impossible to lay down details of practice which shall apply to every case, but the following are the chief methods of attaining satisfactory service:—

1. Allot such loads to operators that they are neither over-loaded, nor allowed to get "slack" through under-loading.
2. Provide adequate junction lines for work between any two Exchanges.
3. Work such lines on the Order-wire system as soon as ever the traffic is found to justify it.

It has become too usual for the load of an operator to be stated in the number of subscribers she is supposed to answer. This standard is very misleading. Not only do some subscribers use the service more than others, but different classes of lines throw more or less work upon the operator. To attend to a call office line takes more time than to attend to an ordinary subscriber, because the operator must, in addition to doing all the usual work in connection with a call, see that the proper call office fees are paid or accounted for.

If an operator is over-loaded, she cannot give a good service to all the subscribers. On the other hand, if she is under-loaded, she gets "slack," and gives an inefficient service.

Between these two extremes of over and under-load there is an efficient mean, varying with the class of service.

The local conditions must largely govern the decision as to the efficient load, but taken as an average on "Flat Rate" services and boards such as those at Brisbane or Sydney (but not at Melbourne or Adelaide), the efficient load is about 200 calls per operator in the busiest hour. If this load is, for any reason, exceeded, the service suffers.

It is interesting to note the effect the class of service has upon the use made of it. When an unlimited service is given (at flat rates), the subscribers use their instruments from 12 to 15 times a day, while if they have to pay according to the use made of the service, 3 or 4 calls a day is the average. It will be readily seen that it costs more to provide a flat rate service than to provide a measured service upon this basis, for, as before stated, the load upon an operator is measured, not by the number of subscribers she has to attend to, but by the number of calls they make in the hour, and the class of service.

The practice of making systematic and continuous service tests is one to be strongly recommended for adoption in every large Exchange. By this means a continuous check is kept upon the operating, and upon the service generally, and a more efficient operation results. Details of the methods of applying the tests will form the subject of a later memorandum.

In all large Exchanges in the United States operators are trained in fully-equipped schools, where they are instructed in all the branches of operating before even they enter the Exchange proper. The expenditure in equipping such schools, and maintaining them with the necessary staff of efficient teachers, though great, is found to be fully justified by the results.

In every telephone undertaking operated by companies in America it is especially noticeable that excellent accommodation is provided for the operators in the shape of meal, retiring, reading, and bath rooms. Companies find that a liberal policy in this regard is a good one.

One of the most impressive facts in modern telephone work is the extent to which real engineering has taken the place of the "rule of thumb" methods. In modern work, estimates are carefully made, not only for the coming year's work, but of the development to which the system will attain in, say, fifteen, or even, in some cases, twenty years; and all work done to-day is so proportioned that it will eventually take its proper place in the ultimate scheme. In laying down each section of the work, the ultimate scheme is kept well in view, and maximum efficiency and economy in every part is obtained.

No better example of the importance of this design can be

*Continued from the issue of May 12th.

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given than that of the wire plant of a large telephone underground system. Lack of design here may involve an unnecessary expenditure of many thousands of pounds, while careful engineering will save this amount, and not lessen the commercial efficiency of the system in the slightest degree.

I have been most strongly impressed with the fact that in every successful modern telephone undertaking there has been special attention paid to staff. Not only is the staff noticeably large from our Australian point of view, but the officers are individually men of high capacity. Telephony requires engineering, and engineering cannot be carried out without trained engineers. Modern systems require, even in the workmen, a higher grade of intelligence than hitherto. In one large system the chief engineer informed me that he was unable to obtain a sufficient supply, even from such technical institutions as Harvard.

ABSTRACT FROM REPORT UPON THE QUESTION OF INJURIOUS AFFECTION OF TELEGRAPH AND TELEPHONE LINES BY STRONG CURRENT WORKS.

It is first to be noted that in all modern telephone work there is as little as possible open aerial work. All the main cables are underground, and much of the distribution is by cable arranged within building blocks. In such cities as London and New York, not to mention those much smaller, it is a rare thing to see new work include aerial wires. In London the post-office alone has the right to put wires underground, therefore for a time the National Telephone Company's old aerial wires remain, but they are admitted to be bad practice.

It may, perhaps, be well to summarize the practice and opinions of each of the countries visited.

America.—Where telephone lines are erected aerially, the onus of protection rests with the telephone companies. Each party is supposed to look after himself. It is common to see wires of all sorts erected on the same poles or crossing in what we would consider a dangerous manner. Guard wires are practically unknown. Accidents are common. In cases of loss of life or injury to a third person, the law appears to throw the responsibility on both parties (telephone and power). The fact standing out most prominently is that the Telephone Company has no right to require the power companies to take any steps to protect the telephone lines or works. The tendency at the present time is to get the question reopened, as present practice is based on what is thought to be a wrong decision.

The precedent which is now found to be detrimental is that created by the decision given when the right of the telephone companies to protection against trolley systems when the telephone companies were using the earth as a return, was first under consideration. It was then ruled that the Telephone Company could not claim the exclusive right to the use of the earth, and that they must, therefore, protect themselves (from induction) by the use of metallic circuits or common returns.

This decision has now been taken as throwing the onus of self-protection upon everybody using a common property, and as applying also to the use of the earth by gas and water companies.

The cases are not at all parallel. At the present day no effort would be made to obtain protection from induction if single-wire circuits were being used, but it is thought that more protection against electrolysis should be given.

England.—The Board of Trade regulations indicate the present requirements. A gentleman with whom I fully discussed the matter considers that there is a tendency in England to overdo protection. Guard wires are undoubtedly a nuisance, and may be avoided to a great extent by proper telephone construction.

Where, however, protection is necessary, cradles are preferable to guard wires. The Board of Trade, while requiring guard wires in the interests of public safety, does not touch the question of cost, nor of the legal responsibility in the event of damage to a third party. This latter question is now being considered in legal quarters. No decision has yet been arrived at.

ABSTRACT FROM MEMORANDUM *re* THE MESSAGE RATE (MEASURED SERVICE), OR TOLL SYSTEM OF CHARGING FOR TELEPHONE SERVICES.

When telephone exchanges were first started about 1876, no information was available as to the extent and effect of traffic. Flat rates on an arbitrary scale were charged for all services. This continued until about 1896, at which time the American Bell Telephone Company was required by stress of competition to introduce every possible means of popularizing its service. It was at this time that the features which have since dominated telephone practice were introduced. These features were the common battery system, a measured service, and party lines.

Analysis of traffic under a flat rate gives the following leading characteristics:—

In exchanges from about 100 telephone subscribers the calls average about five per subscriber per diem; in the larger exchanges of from 6,000 to 7,000 subscribers the calls per diem average about seventeen in some exchanges. I believe that the averages in Melbourne and Sydney have exceeded fourteen calls per subscriber per day on occasions.

This large number of calls may be divided among those which are necessary and covered by the subscription paid; those which, though covered by the subscription paid, might be avoided, being frivolous and unnecessary; and those which are made by persons who are not subscribers, but use the instruments of their neighbors, and thus pay nothing for the service.

The first point which it is necessary to emphasize in considering this question is that the number of operators to be provided depends, not upon the number of subscribers connected, but upon the number of calls these subscribers make. Therefore, if we can reduce the number of calls, we can proportionately reduce the number of operators, or if we do not care to do this we can increase the efficiency of the service with the same number of operators.

Not only must the number of operators be increased when the calls are increased, but the equipment at the central Exchange must also be increased—that is to say, a switchboard for 10,000 subscribers, each of whom made twenty calls a day, would cost very much more than a switchboard for the same number of subscribers who made half the number of calls a day.

Nor are these (the operating and switchboard) the only sections of the work on which the cost is increased. In every large system utilizing more than one exchange in a given network these several exchanges are connected by junction lines.* The number of these junction lines must be increased as the traffic over them is increased, so that, with subscribers who make twenty calls a day between two exchanges, the cost for the junction lines would be twice as much as that if the subscribers made but ten calls per day.

The proportion which the cost of junction lines bears to the total first cost of the service varies with the circumstances of each case; but it is no infrequent case when the flat rate system of charging is in force, for the length and the cost of the junction lines to a particular exchange to far exceed the length and cost of the subscribers' lines on that exchange. Instances of this kind exist in the Commonwealth service.

In addition to these disadvantages, unnecessary and illegitimate calls increase the wear and tear of all the equipment, without any accruing revenue. Further, the anomaly is created that, however much the service is improved, the calls will automatically still further increase, and cause still further wear and tear and expense for operating, and this without any increase of revenue.

The foregoing deals with the question of the cost of construction and operating, which from the departmental point of view are most important. From the subscriber's point of view there is the additional disadvantage that with the increased traffic the number of times a particular line is found to be engaged is largely increased.

With an increase in the number of free calls on all lines, the disadvantages enumerated increase, until at length it is impossible to give a satisfactory service at a reasonable cost with the flat rate method of charging.

The introduction of a measured service would have the effect of at once removing all unnecessary and illegitimate calls.

*Another name for trunk lines.

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The Development of the Telephone Cable*

By Thomas Stanley.

CONTINUING the discussion of the submarine cable, there are two more types which deserve attention. One of these is the double sheath cable shown in Fig. 13.

This submarine cable has a capacity of 50 pairs. The outer sheath is shown at *a*, the inner one at *b*, the serving at *c* and the conductors with their paper insulation at *d*, *d'*, *d''*, etc. In Fig. 14 (P. 329) is shown a single lead sheath, iron armored cable also of 50 pairs capacity. The armor wires are shown at *a*, the two wrappings of hemp at *b* and *c* respectively. The sheath is shown at *d* with the three jute wrappings at *e*, *e'*, *e''*. One of the bands is shown at *m*.

The method of constructing lead sheath and iron armored cables as carried on in the factory is as follows: The conductors are fed up through a table upon which are placed numerous spools containing the paper ribbon to be used for insulation. These spools are made to revolve, half the number in one direction and half in the other. Upon each conductor is wound a ribbon from one spool in each of these two groups so that two layers of paper are wrapped about each conductor in reversed directions. After the conductors have received their insulating coating, they are twisted together in pairs. These pairs are then taken through a machine which lays them up in reversed layers; after which the now formed core is passed through a tank containing bituminous compound. The core is then brought out and passed through the machine when it receives its wrapping of twine. The core is now ready for the lead sheath, and it is accordingly passed through a die of the proper size, where the lead sheath is forced upon it. The core covered with the lead sheath is then passed through a second wrapping machine, where it receives three layers of tarred jute. It is now ready for the armor machine from which it emerges with the armor in place. The armored cable is then passed through a third wrapping machine, in which it receives the two reversed layers of hemp, which have been previously saturated with a mineral pitch compound. It then passes through the whitewash bath, from which it emerges ready to be placed on the reel.

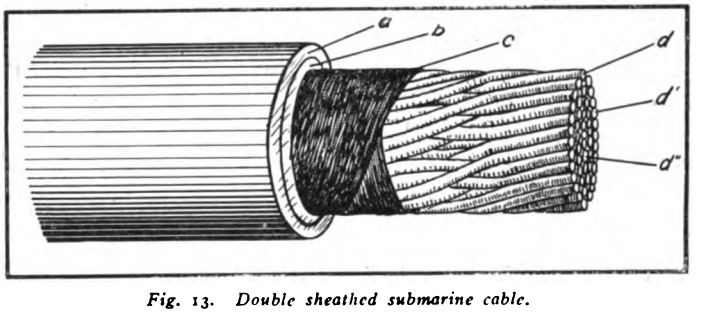

Fig. 13. Double sheathed submarine cable.

The switchboard cable is one which plays a very important part in the make-up of telephone lines. This cable runs from the distributing board to and through the switchboard. It is also used for runs to points about the exchange. Since this cable is always placed in protected places, there is no necessity for rigid protection. As space is of the utmost importance, it must be made as small as possible, and of such a shape as to be neatly laid up in racks. These cables are usually made up in sizes of 20 pairs each, though this is often varied to accommodate special circuits. To economize space, and also to allow the cables to be placed in groups, they are usually made of an elliptical cross section, of greater or less eccentricity. Both on account of the space requirements, and also to make the cables easy to form, No. 22 B. & S. gauge wire was selected as the size best suited. Larger wire would render the cable too stiff, and smaller wire would increase the resistance of the line beyond the allowable limit. The insulation is either wool, or a double covering; the inside one of silk and the outside one of cotton thread. Over the conductors is wrapped a layer of cotton threads, then one of lead foil, to exclude moisture, and the whole is covered with a cotton braid closely woven and saturated with soapstone. The construction of switchboard cables originated as follows: With the development of switchboard wiring, and the consequent multiplicity of the circuits needed, came the necessity of combining the wires for each circuit into a cable form. The number of circuits required was ascertained, the location of the terminals at each end and the distance between them. Ordinary annunciator wire was employed and a number of runs made between the terminating points marked off by nails driven in a flat board, corresponding with the number of circuits. This bunch of wire was sewed together by means of Irish flax thread. The cable so formed was then boiled in paraffine to expel moisture and shellaced ready for use. In order to avoid this labor it was necessary to build a regular cable which would have higher insulation and be better protected from mechanical injury. At the same time it was remembered that the conductors would have to be exposed in the proper manner at the points where the terminals occurred, so that it was necessary to provide covering that could be easily removed by the force of men who were doing the work of installation. This consideration precluded the use of lead or other hard substance as a covering; so that closely woven cotton braid was adopted. Since this form of braid gave little or no protection from the entrance of moisture, it was determined to wrap the wires with a layer of lead foil. This cable readily provided terminals on stripping the ends. The use of factory-made cable of this type prevented the increasing or reducing the number of pairs of which it was composed by the installing force at will in order to meet whatever special requirements might present themselves as the work progressed. These cables are made up in different sizes to meet all the possible contingencies that may arise. Arrangement of the different classes of circuits used in a central office was then determined upon. The terminals themselves are arranged into groups, each having special features as to shape and spacing.

Cables are made of different sizes to furnish the most economical and convenient arrangements for connecting these different groups. For example, subscribers' multiple jacks are arranged in groups of 20. The subscribers' answering jacks are usually arranged in groups of 10, although groups of 20 are sometimes employed. The toll line answering jacks are usually arranged 5 in a group. Wherever a signal, either busy or answering, is used in connection with the jacks, the grouping is the same as that of the jacks with which they are associated. In many forms of switchboard wiring, each jack is equipped with 3 lugs, two for the use of the talking wires and a third one for the operation of the busy test or signal. As a result of the above considerations, it will be apparent that amongst the many classes of cable required those on the subscriber multiple should contain 20 pairs of conductors for talking wires, and 20 single wires for the busy test. On the other hand, the cable used for the subscriber answering jacks, must contain 10 pairs for talking, 10 single wires for the busy test, and an additional 10 wires for the answering signal. As a matter of fact, since the answering jacks and their corresponding signals are sometimes arranged in groups of 20, the cable used for this purpose is made up of 20 pairs for talking, 20 single conductors for the busy test, and the same number of single wires for the answering signals. Under these conditions when the answering jacks are arranged in groups of 10, the cable is split between two rows of jacks and signals. With the toll line answering jacks, it has been said that they are arranged in groups of 5, so that in order to meet the requirements ex-

(Continued on page 329.)

*Continued from the issue of April 1st.

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Economical Telephone Accounting and Filing Systems

ARTICLE IV.—OPERATORS' TOLL TICKETS AND RENTAL AND TOLL BILLS.—Continued.

*By Charles C. Wilmot, Telephone Accountant.

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TOLL service bills may be made out in a form similar to that shown in Fig. 14, which illustrates a standard ruling. This form, No. G-82, is designed for large exchanges which have automatic billing machines with endless roll carbon, or typewriters with a tabulating attachment. The duplicate is blank. The loose leaf method of filing is proving most satisfactory for this form. In large exchanges provided with adding machines, toll bills can be posted directly to the

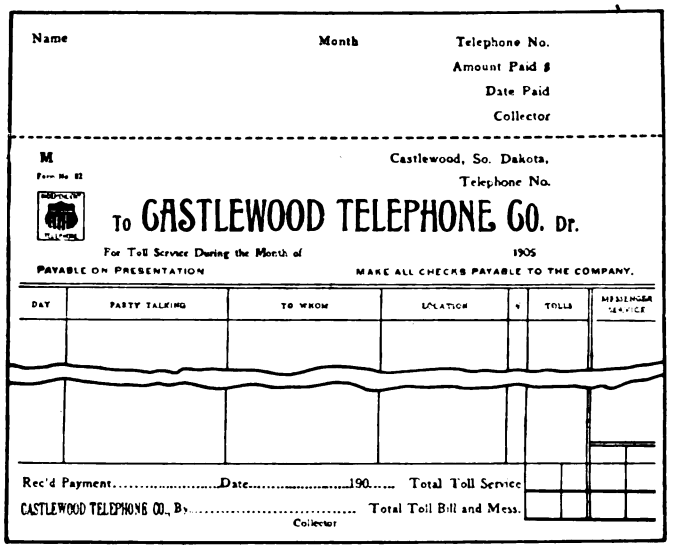
Name
Month
Telephone No.
Amount Paid $
Date Paid
Collector
Castlewood, So. Dakota,
Telephone No.
To CASTLEWOOD TELEPHONE CO. Dr.
For Toll Service During the Month of 1905
PAYABLE ON PRESENTATION
MAKE ALL CHECKS PAYABLE TO THE COMPANY.
DAY | PARTY TALKING | TO WHOM | LOCATION | TOLLS | MESSENGER SERVICE
Rec'd Payment.....Date.....190..... Total Toll Service
CASTLEWOOD TELEPHONE CO., By..... Total Toll Bill and Mess.
Collector

Fig. 14. Form No. G-82, designed for toll service bill.

subscribers' lease ledger accounts from the carbon office copy and the totals of bills added on the machine, this amount to be credited to "toll earnings" for the month.

One good operator can do the entire billing in a general office of a large system having six thousand to eight thousand local subscribers.

In Fig. 15 is shown a rental blil, form G-85. Three bills are printed on one sheet and have a collector's coupon attached. These forms are for large exchanges which use a billing machine or special typewriters. Each month or quarterly term is printed in to save time and labor. The size of sheet is 8½ x 11.

Form G-87, Fig. 16, is the same as form G-85, except that the term of rental is left out. This form is printed singly and padded, and is to be used for balance rendered, duplicate bills, office receipts, or small exchanges. The size of sheets is 3½ x 8½ inches.

A special rental billing system for large exchanges is shown in form No. G-87-B, Fig. 17. By the perfected automatic addressing process, which is very rapid, there may be finished ready for the collection or mailing department, from two thousand to three thousand rental bills per hour. No checking or comparing is necessary. Amounts are correct beyond question. Bills made in this way are as neat and attractive in appearance as if made by expert typewriters. Three operations date and make the complete bill with the collector's and cashier's coupons, giving the telephone number, name, address, district and amount of rental. A city can be laid out in districts for collectors, and the districts indicated by either letters or figures shown on each bill. When bills are completed they can be rapidly sorted into districts and turned over to collectors who do not have to list the bills in separate records, the top coupon giving them all necessary information in case they leave a bill for a later call. They simply tear off the collector's coupon, make their memorandum when to call and follow up the collection by a little pocket "Tickler system" made up of the coupons.

*Editor's Note.—Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

DEVELOPMENT INCREASING IN SOUTHERN VIRGINIA.

By Wm. R. Tyree.

IN southside Virginia there has, up to the present time, been little or no progress toward industrialism. But, now that the tide of capital from the North is pausing on its onward march toward the far South, giving the Old Dominion her share of the "world's goods," on every side one may see the effects of the dawning of a new business era. And in this new awakening to what her real position should be among her sister States, there has been no more potent factor in the great progress of Virginia than the telephone.

In Charlotte County, one of the oldest and most historical of the many historical counties of the State, one may communicate by telephone from the old town of Smithville (the county seat, now known as Charlotte C. H.), where Patrick Henry made his first speech, which knew the early and later life of John Randolph, and through whose village streets the French marched to fight the battles for American independence, to all the larger cities of Virginia, many of the smaller ones, and not a few of the towns and villages in Southern Virginia.

In this work and as an educational medium, the Central Telephone Company, whose home office is located at Charlotte C. H., is forging ahead as a factor in the business and home life of those who have availed themselves of the opportunity presented to them.

In 1887 it was known as the Smithville and Drakes Branch Telephone Company; in 1904 the charter was amended to read,

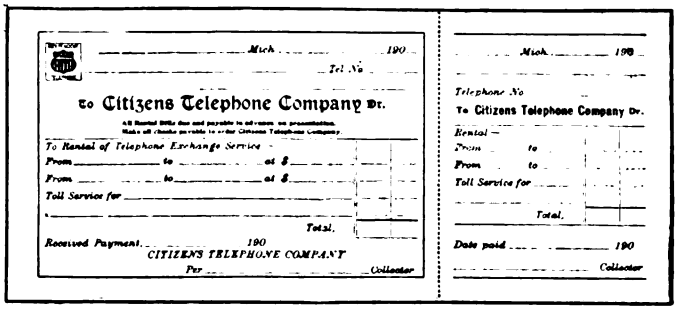
Mich. 190
Tel. No.
To Citizens Telephone Company Dr.
To Rental of Telephone Exchange Service
From ... to ... at $...
From ... to ... at $...
Toll Service for
Total.
Received Payment. 190
CITIZENS TELEPHONE COMPANY
Per ... Collector
Mich. 190
Telephone No.
To Citizens Telephone Company Dr.
Rental —
From ... to ...
From ... to ...
Toll Service for
Total.
Date paid ... 190
Collector

Fig. 15. Rental bill, Form No. G-85. On one sheet are printed three bills, with collector's coupon.

"The Central Telephone Company," with W. H. Smith, President, Jno. B. Faris, secretary and treasurer, and W. G. Williams, general manager; with an increased authorized capital stock of $20,000—actual stock sold $11,000. It has 252 miles of telephones and 240 metallic circuits. Its lines connect with all the Independent telephones in the several towns and villages of the immediate counties, such as those reached by the Southside Telephone Company, the Lunenburg Telephone Company and others, giv-

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ing a possibility of connections extending over 500 miles of territory, and with telephones in the counties of Charlotte, Appomatox, Campbell, Lunenburg, Prince Edward, Buckingham and Notaway. In the territory reached by its subscribers are many important cities and towns, such as Lynchburg, Farmville, Blackstone, Burkeville, Keysville, Meherren, Drakes Branch, as well as every voting precinct in the county of Charlotte, and nine-tenths of all the post offices.

From the above showing it is easy to observe that not only the immediate county of Charlotte is ably and efficiently served with the Central's system, but almost all of the adjoining counties equally as effectively. It is only a short while in the future when the Independent companies of Virginia will be as plentiful as they have heretofore been scarce.

IOWA MUTUAL COMPANIES REPRESENTED IN STATE ASSOCIATION.

REPRESENTATIVES of mutual telephone companies throughout the State of Iowa recently held a meeting at Jessup for the purpose of securing representation in the State Association. The meeting was called by Dr. E. W. Harradon, president of the Jessup company. As a result of the interchange of ideas and experiences a set of resolutions were adopted, which it is believed will greatly aid and strengthen the Independent movement among the smaller companies. C. A. Hollis, president of the Farmers' Mutual Telephone Company of Hudson, was selected to represent the companies in the State Association.

THE TELEPHONE IN THE COUNTRY STORE.

"THE past two years have seen a revolution in the methods of country storekeeping," says a writer in the *Michigan State Gazette*. "No longer can the city visitor, temporarily sojourning in rural districts, scoff at the rusty and time-worn wares he encounters if he wishes to make a purchase at the village store. If the storekeeper's stock is not up to the urban standard, it is his own fault.

"'We used to be six months or a year behind the city in stock,' said the proprietor of a general store in a small town 60 miles from Detroit. 'Now we are only a few days behind at the most. It seems like a miracle to some of us old-timers when we think of it, but really its is simple enough. Here's the secret:

"'He went over to the telephone and tapped it significantly.

"'This and modern railroad methods do the trick for us,' he continued. 'If I want anything I simply call up "Central," and in less than a minute I am connected with my jobber in the city. I tell him what I need and get my order the next day. That is

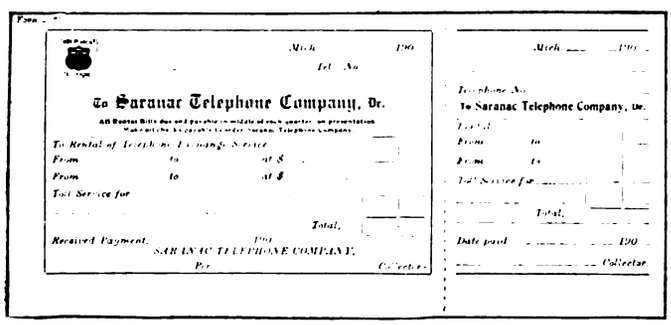
To Saranac Telephone Company, Dr.
To Saranac Telephone Company, Dr.

Fig. 16. This bill for telephone service is similar to the one shown in Fig. 15, on the opposite page, except that the term is omitted.

one of the great advantages of having the service. It allows me to talk to any of the people anywhere who deal in my lines of goods, and I can get just as good prices and just as up-to-date merchandise as if I took a train and spent three or four days buying each month.

"'In old times communication with the jobber was a tedious business, and most of us bought stock twice a year only. In the early fall we laid in goods for the whole winter, and so on. Now we buy almost from day to day; we have to keep up with the times.

"'You see,' he went on with a quiet smile, 'It's a big saving to us to do business by telephone this way. We let the mills carry our stock for us instead of tying up a lot of capital—which most of us have none too much to tie up, anyway. When we want a thing that we don't sell often enough to make it profitable to carry all the time, we can get it as quickly as the customer can, and a good deal more easily because we know how to go about it. And we don't lose our profit either.

"'As a matter of fact, our profits never were so fair as they are now. I can remember—and it wasn't so very long ago—when I would buy a bill of goods one week and find out from the newspapers the next that prices were fluctuating so I might have saved myself and my customers a good large sum if I hadn't been so

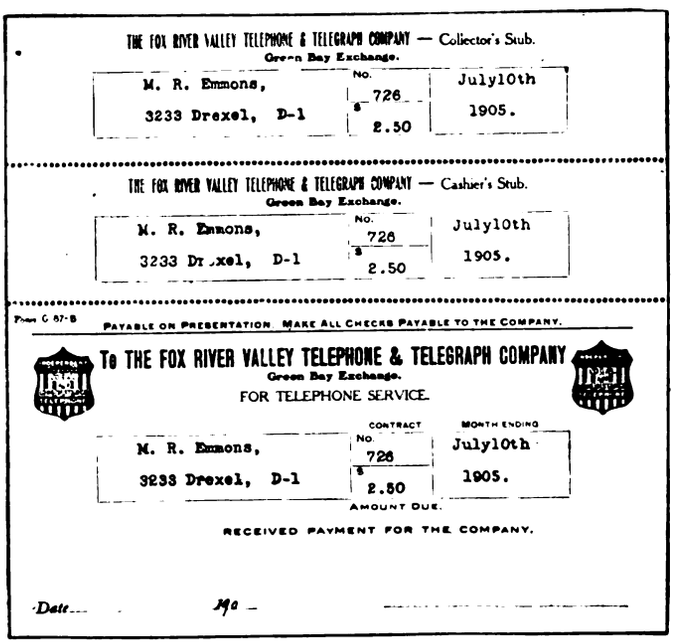
THE FOX RIVER VALLEY TELEPHONE & TELEGRAPH COMPANY — Collector's Stub.
Green Bay Exchange.
M. R. Emmons, 3233 Drexel, D-1 | No. 726 | $ 2.50 | July 10th 1905.
THE FOX RIVER VALLEY TELEPHONE & TELEGRAPH COMPANY — Cashier's Stub.
Green Bay Exchange.
M. R. Emmons, 3233 Drexel, D-1 | No. 726 | $ 2.50 | July 10th 1905.
Form G 87-B
PAYABLE ON PRESENTATION. MAKE ALL CHECKS PAYABLE TO THE COMPANY.
To THE FOX RIVER VALLEY TELEPHONE & TELEGRAPH COMPANY
Green Bay Exchange.
FOR TELEPHONE SERVICE.
M. R. Emmons, 3233 Drexel, D-1 | CONTRACT No. 726 | $ 2.50 | MONTH ENDING July 10th 1905.
AMOUNT DUE.
RECEIVED PAYMENT FOR THE COMPANY.
Date... Mgr.

Fig. 17. Special rental bill referred to on page 322. Another form, known as No. G-87-c is similar except that collector's stub is omitted.

rash about placing my order. At that time, of course, there was no way of following the fluctuations in prices, and no convenient way of reordering. With the telephone, though, I can find out in five minutes how the prices are any morning or every morning, and I can buy as little as I choose without being afraid of getting left high and dry by a sudden run on a line I am short in.

"'I tell you,' the rural merchant said as he came back from answering a call of a customer six or eight miles away who telephoned down so his order would be all put up for him when he went by in the afternoon; 'I tell you, since I took the instrument there into partnership'—and he pointed with a satisfied air to the telephone through which he had just been talking—'I've begun to find out what it is to do business. If there is anything that is worth more to me than my credit and my insurance policy, it's my telephone.'"

PORTSMOUTH, OHIO, SYSTEM TO BE RECONSTRUCTED AND ENLARGED.

CONSTANT increase on the demand for Independent service in Portsmouth, Ohio, has led the directors to authorize an expenditure of $80,000 for extensions and improvements. The present switchboard, which is loaded to its utmost capacity with 1,640 subscribers, is to be supplanted with a new one having a capacity for 3,000 telephones. New quarters have been secured and are being remodelled to meet the requirements of the system. Upwards of $20,000 is to be spent for new underground and aerial cables and $15,000 for new telephones. When the process of reconstruction is completed, the company will have one of the finest plants in the State.

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THE EDITOR'S PAGE

DEMAND FOR EARLY NUMBERS OF THE AMERICAN TELEPHONE JOURNAL.

A SUBSCRIBER'S offer for a considerable number of past issues of THE AMERICAN TELEPHONE JOURNAL, as referred to on page 10 of the advertising section is a most gratifying evidence of the value attached to the treatment of the subjects handled in these papers. In any industry which is making progress at a rate equal to that of the telephone business, the record of advancement must necessarily be largely contained in the papers devoted to the industry. Moreover, all progress depends upon knowledge of that which is past, and it is for this reason that the columns of a technical paper have a permanent value.

Coming to the direct application, which has been brought home so very pleasantly, it appears that THE AMERICAN TELEPHONE JOURNAL is believed to fulfill these requirements and to have a thoroughly substantial worth.

BRING THE FINANCIAL MEN!

OPPORTUNITIES for becoming familiar with the advances made by Independent telephone companies throughout the entire country will be offered at the Chicago convention on June 26, 27 and 28. During the past year scattered reports have come in from various sections, showing the increase of business; and direct and indirect evidence has been presented by members of the various State associations that the features of construction, maintenance, operating and accounting are receiving consideration which enables nearly all companies to at least know in what direction lies genuine progress. The enthusiastic and earnest spirit shown in the State assemblages gives the firmest assurance that, rapid as has been the development during the past, the future is likely to show even greater progress along the same lines.

The public is becoming more and more enlightened with regard to telephone matters as time goes on. The advantages of articles in the daily press are being appreciated by officers of telephone companies, and more people are becoming alive to the uses of the telephone which make it indispensable. Go where you will, you will find it hard to discover a person who does not admit that the service would be useful to him; and it only remains for the telephone solicitors to convince people who can afford it that the conveniences offered will be worth the price which it is necessary to pay.

The Independent movement has been getting both bigger and stronger with great rapidity during the past year. It has been going ahead; like all other moving bodies, it has gathered momentum, and unless retarded by some outside influence, even the same force behind it during the coming year will cause it to advance at an even greater rate. It is imperative that nothing shall retard it. Development in the past has been due to the efforts of men of two classes; the telephone men who have done the actual building, and the financial men who have provided the materials with which the work might be done. It sometimes seems to those who are familiar with the extraordinary efforts which have been put forth in the past that the resources of the builders are unlimited; but, however that may be, the statement is never true of financial men. When heavy, repeated demands are made, each of these individuals always reaches a limit which he cannot exceed. When the resources of one man are fully employed, he must call upon his neighbors to assist in forwarding the project he has undertaken.

These neighbors, however, unless they have the most implicit confidence in his ability and sound judgment, and perfect information, will not go in until they learn for themselves the details of the enterprise. A business man wishes to know the people who are to have the spending of the money he invests for profit; he wishes to see for himself whether they are intelligent, trustworthy and earnest. This is especially true in a great affair like the telephone industry, where the advancement of one unit depends in the most intimate way upon the progress of numerous associates, both near and remote.

In view of the fact that Independent growth during the coming year will be extremely rapid, great amounts of money will be needed to prepare a plant to meet the extraordinary demand for service which is certain to exist; and it remains to all interested persons to take the fullest advantage of the opportunity which will be afforded by this Chicago convention. Let every Independent manager bring those who can be interested in the movement from a financial standpoint. The bankers are building the telephone business as much as the operators, and have a rightful place in the convention; they will do good to the cause by being there. Once on the ground they will have an opportunity to talk with the men who have built the systems, and know how to operate them, and know how fast the growth has been in the past, and exactly what the prospects are for its continuance. They will appreciate more than they ever can be induced to by any other means the fact that the Independent movement is a National movement of interests which are closely united, and that its strength and its prospects are tremendous.

SPECIAL SUBSTATION INSPECTIONS.

WHEN a dangerous current passes over a telephone line to a subscriber's premises, and does more or less damage the telephone company sends out one of its best men to make a thorough investigation. Unfortunately, however, it is usually true that he arrives too late to find anything to investigate. The protective apparatus is not in the same condition that it was before the accident, and he is far behind the sudden electrical current which caused the destruction. The only thing left for him to do is to try to work out a plausible theory which will take the responsibility off the company.

These investigations are rather expensive, and the occasions which bring them about create more or less distrust in the minds of the subscriber and those who wish to secure telephone service.

Of course there is no way to absolutely eliminate the possibility of the passage of a dangerous current, from lightning or other causes through material which was not put in place for such a purpose. The proper maintenance of protective devices and wiring, however, will go far toward destroying the liability of the occurrence of such accidents. This seems to imply the desirability of occasional inspection by an especially competent man.

Writers on the value of telephone securities frequently call attention to the fact that telephone company's equipment is of a sort which is less likely to cause injury to property and life than is that of many other public service corporations. This desirable condition can be reduced to the minimum by proper maintenance of the protective apparatus, so that the expenses during a year need not bear an undue surplus for unforeseen contingencies due to accidents. Moreover this practice of special inspection by skilled men has an obvious effect in reducing the rate of depreciation, and insuring that the insulation of the lines throughout the entire system shall be sufficiently high to enable the best standards of talking and ringing to be maintained.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

TEXAS COMPANIES HAVE RIGHT OF EMINENT DOMAIN.

Have Texas telephone companies the right of Eminent Domain?
W. H. S.

REV. ST. 1895, tit. 21, c. 7, giving "telegraph companies" power to exercise the right of eminent domain is held to apply equally to "telephone companies." Gulf C. & S. E. Ry. Co. vs. Southwestern Teleg. & Telep. Co., 45 S. W. 151. Telephone companies in Texas therefore have the right in question.

RUNNING WIRES ACROSS PUBLIC STREETS.

At one place our line crosses the public streets of the city. The poles themselves are not in the streets, but are located upon private property with the consent of the owners. The wires crossing the street are suspended at an elevation which does not interfere with public travel. Nevertheless, the municipal authorities have started a suit for a preliminary injunction restraining the further erection of poles or supension of wires across the street, and to force us to move the wires already erected over the highway. The authorities claim that our company has no right to suspend its wires over the street without the consent of the city, and that this consent has not been given. What are our rights under the New Jersey laws?
B. M. R.

UNDER the circumstances it is the editor's opinion that your company has the right to suspend its wires over the street in question. The general laws of the State provide that telephone companies may use streets subject to such regulations and restrictions as the corporate authorities may impose. This is held not to warrant a regulation which imposes new conditions on the exercise of the corporate franchise. It does not appear that the city has passed any ordinance prohibiting the stretching of wires across the street. Even if it had been so, such a provision would not have been a "regulation and restriction" which the municipality under the law has power to impose. The right of regulation does not include the right to prohibit. A telephone company has authority to conduct a telephone business under certain conditions and with certain privileges in the State, and this right cannot be restricted by the city in the way it attempts to do. Inhabitants of Summit Twp. v. N. Y. & N. J. Tel. Co., 41 A. 146.

KNOWLEDGE OF FALLEN WIRE IN PERSONAL INJURY CASE.

WHERE an electric company negligently fails to insulate its wires so that an adjacent fallen telephone wire becomes charged with a deadly current, and causes death, the electric company is liable, without regard to its actual knowledge of the fallen wire, or its diligence in discovering it. Parsons v. Charleston, Etc., Elec. Co., 48 S. F. 284, 69 S. C. 305.

TEXARKANA OFFICIALS PERPETUALLY ENJOINED FROM MOLESTING TELEPHONE COMPANY.

THE city of Texarkana, Tex., and the Southwestern Telegraph & Telephone Company have been contesting for some time over the question of agreeing upon a franchise. The city claimed that the company was operating without a franchise, whereupon the company promptly applied for a charter from the city. The city attempted to impose conditions that were unacceptable to the company and its demands were flatly refused. The city then commenced suit asking that the company be ousted from the city. The contention of the attorneys for the company was that the general statutory law adopted nearly thirty years ago granting the telegraph companies throughout Texas the right to establish and maintain their lines along the highways, waterways, etc., of the State, applied with equal force to telephone companies. The city claimed that this general statute was superseded shortly afterward by a special provision granting all cities "exclusive control over the streets, alleys," etc. throughout the State of Texas. The decision of the judge sustains the contention of the telephone company.

JOINT USE OF POLES BY ELECTRIC COMPANIES IN CONNECTICUT.

Our company is being sued for damages by a man who was injured in handling a wire that touched a guy wire and became charged with electricity by reason of a defective circuit breaker. A street railway company and ourselves were using the same poles at the time. He charges that we had no right to use the same poles and that the accident would not have happened if we had not been doing so. We had a contract covering the joint use and it was also done at the request of the city authorities. Were we not right in our use of the poles?
L. O. R.

THERE seems to be no doubt of the correctness of your position so far as the joint use of the poles was concerned. Full control of the use of wires and poles is given in Connecticut to the local authorities by section 3,946 of the General Statutes and section 3 of chapter 169 of the Public Acts of 1893. It does not appear that the joint use of the poles increased the danger. In fact by reducing the number of poles the highway could be used with greater convenience. The case seems to be within the ruling of Bergin v. Southern New England Tel. Co., 38 A. 888.

EMINENT DOMAIN AS APPLIED TO NEW YORK TELEPHONE COMPANIES.

THE transportation law of New York, authorizing a telephone company to erect and maintain its lines over the streets and highways and declaring that, if it cannot agree with the owner on the compensation to be paid therefor, the compensation shall be ascertained in condemnation proceedings, empowers a telephone company to take proceedings to condemn the right to place its poles and lines in a street in front of an owner's property. The exercise of this power is called the right of emiment domain. A telephone company seeking to condemn the right to erect poles and lines in a street in front of an owner's property should only be permitted to acquire an easement for its poles and wires in the street. New Union Telephone Co. v. Marsh, 89 N. Y. S., 79, 96 App. Div. 122.

INJURIES FROM CONTACT OF TELEPHONE WITH ELECTRIC WIRE.

WHERE a person using a highway was injured by coming in contact with a telephone wire which had fallen on the wires of an electric railway company which used the same support for its wires as did the telephone company, and such detached wire became heavily charged with electricity, in an action for the injuries received it was a question for the jury whether the telephone company was negligent in failing to properly guard its wires, and it was proper to deny a motion to take the case from the jury and render a judgment for the telephone company. Burton Tel. Co. v. Gordon, 25 O. Cir. Ct. R. 641.

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IN THE OPERATING FIELD

INDEPENDENT WINS IN MICHIGAN.

TELEPHONE men throughout the state of Michigan are watching with interest the attempts of the Bell Company to buy up or otherwise control the rural situation. A small exchange at Parma, owned by a man named Frank Hubert, recently passed into the hands of the Bell. An attempt was then made to get control of the North Parma company which operates a system of 225 telephones on rural lines that terminated at the Parma exchange. At the annual meeting of the company it was decided not to sell, but to build an exchange and erect new lines to connect with those of the Citizens' Company at Jackson.

GOOD SHOWING OF LOUISVILLE COMPANY.

A RECENT financial statement issued by the Louisville Home Company for the month of March gives the gross earnings as $29,204.98. After deducting operating expenses and fixed charges there remains the amount of $8,675.95.

The total assets of the company amount to $3,106,230.81, of which the plant and equipment represents $2,796,456.72, and building and real estate $50,763.40.

The company is now operating exchanges in Louisville, Ky.; New Albany and Sellersville, Ind., and is building two more at Anchorage, Ky., and Pewee Valley, Ky.

NEW INDEPENDENT COMPANY AT MIDDLETOWN, N. Y., ALREADY GIVES ITS SUBSCRIBERS EXTENSIVE SERVICE.

INDEPENDENT service has again been resumed in Middletown, N. Y. Some time since the local system consolidated with the Bell. The Middletown Telephone Company was immediately organized and started business on March 10th with a considerable number of stations in operation. Toll line service is given in connection with numerous other Independent lines, including those of the Colonial Telephone Company, Newburgh; Dutchess County Telephone Company, Poughkeepsie; Farmers' Union Telephone Company, Sussex, N. J.; Highland Telephone Company, Highland Mills, connecting Middletown with Monroe, Goshen, Campbell Hall and many other places; Port Jervis Telephone Company, Port Jervis; Sussex Telephone Company, Newton, N. J.; Warwick Valley Telephone Company, Warwick; West Shore Home Telephone Company, Catskill; Chester Telephone Company, Chester, and Citizens' Standard Tel. Co., Kingston.

INDEPENDENT COMPANY IN BALTIMORE MAKING STEADY PROGRESS.

INDEPENDENT development in Maryland is keeping pace with the growth in other States. In Baltimore it has been exceptionally rapid, the most recent number of the Maryland Telephone Company's directory being much larger than any previous issue. This company was one of the first to operate in any of the larger cities. It has always been progressive, and in the face of many obstacles has built up a large and creditable business.

Inasmuch as the directory of this company represents this development, an analysis of its contents and make up may prove of interest. In all there are 530 pages, which are contained within attractive red covers, making it easily distinguishable from other volumes. Twenty-four pages in the fore part of the book are devoted to a list of toll and long distance points in Delaware, Maryland, New Jersey, Pennsylvania, Virginia and West Virginia. Each point is accompanied with the day and night rate. Following this is the alphabetical list of subscribers in Baltimore, which takes up 271 pages, and then a business directory, in which the various firms are arranged according to an alphabetical classification. An interesting feature of the book is the advertising at the top and bottom of every page. At intervals entire pages are devoted to advertising cards of the most prominent firms in the city. Almost every business or trade is represented, and the directory, therefore, has an increased value to the average subscriber. The outer vertical margins are reserved by the Maryland company for its publicity department, and here in terse paragraphs it draws attention to the value of its telephone service as well as the electric light and power supplied from its central stations. The company's book, as well as its service, is capable of standing on its own merits in the face of the most vigorous competition.

BOOK REVIEWS.

Electric Wiring Diagrams and Switchboards. By Newton Harrison. Publishers: The Norman W. Henley Publishing Company, New York. 258 pp. Price $1 50.

INFORMATION which should be very useful to those who have occasion to do wiring for electric lighting and motor work is contained in this recently published volume. The book presents practical problems in wiring, such as are encountered in everyday work, and gives methods of solution, including tables and diagrams, which are thoroughly explicit and easily understood. The principal of drop of potential in circuits, and the methods of figuring out the wiring for different conditions, with a fixed allowable drop, are included.

In the section devoted to switchboards a special treatment is adopted, in which the reader is led from the elementary principles to the building up of the more complicated panel boards. Especially valuable is the treatment of alternating current wiring, which includes simple methods of obtaining the sizes of wire for single phase, two phase and three phase circuits. An interesting and useful feature of the author's method of handling this subject is the fact that the methods of calculation employ no mathematics other than arithmetic.

This should be a satisfactory text book for those who wish to have at hand a manual containing the essential information required by a practical wireman.

STANDARD TELEPHONE WIRING, by James F. Fairman. Published by the McGraw Publishing Company, 114 Liberty street, New York City. Ninety-one pages, price $1.00 net.

THE author has produced a logically arranged book for wiremen and managers who desire a reference manual to enable them to avoid working out special problems for themselves. A very brief introduction deals with the elementary principles of electric circuits. The various classes of instruments entering into substation wiring are also described, and instructions concerning methods of securing good workmanship given.

The especially valuable feature of the book is a series of a considerable number of well chosen diagrams, which are lettered and explained in the accompanying text. These furnish a useful assortment of suggestions for those who have to do with the various combinations of main line and extension instruments at subscribers' stations which so often arise when it is necessary to meet a demand for service under special conditions. The book is of a convenient pocket size, bound in flexible leather covers.

WIRING HANDBOOK, by Cecil P. Poole. Published by the McGraw Publishing Company, 114 Liberty street, New York City. Eighty-five pages, price $1 net.

THIS is a pocket book for wiremen which gives a good deal of very practical information in a small space. This result the author has obtained by a very careful selection of material, and the statement of information in a way which, while complete, introduces no unnecessary words. The book

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takes up the laying out of lighting systems in accordance with the various plans which have been devised, giving the necessary instructions for calculation. A series of diagrams for direct current motor wiring and alternating current wiring are given, and numerous practical diagrams showing the circuit connections of various apparatus, such as motors, transformers, meters, etc., are furnished. An appendix gives a digest of underwriters' rules applying to inside wiring which should be useful to all who wish to have this information in a compact form. Numerous standard tables in the back of the book, which are referred to from time to time in the text in such a way as to explain their utility, form an extremely valuable portion of the book. These are designed to be used in connection with the laying out of systems of the ordinary types. The book is pocket size, bound in leather, and the information contained is of such everyday value that this feature is likely to be taken full advantage of by those who purchase it.

DELEGATES TO NATIONAL CONVENTION ELECTED IN SIXTH INDIANA DISTRICT.

THE members in the sixth district of the Indiana Independent Telephone Association met in the office of the manager of the Citizens' Telephone Company at Brazil, May 2, 1906. Earl Talbott was chairman, and Jesse W. Weick secretary.

The regular routine business was followed by many earnest discussions on points of much interest to the telephone companies in this district. It was predicted that by the next regular meeting, every Independent telephone company in the district would be a member of the Association, each member taking it upon himself to call on non-members and acquaint them with the conditions throughout the State, and the absolute necessity of all Independent companies joining hands in protecting all investors in Independent telephone property. Delegates were selected for both State and National meetings to be held at Indianapolis and Chicago. Mr. J. G. H. Klinger, General Manager of the Citizens Telephone Company of Brazil, was elected delegate to the National convention to be held at Chicago, June 26, 27, 28. J. W. Weick, of Greencastle, and J. F. Slinkard, of Bloomfield, are the alternates.

The following delegates, representing all counties in the Sixth District and 7,500 Independent telephones, were elected to the Annual Convention held at Indianapolis on the 17th and 18th. Earl Talbott, of Lincoln, E. G. Bush, of Clay City, Joseph Moss, of Linton, O. V. Gerrard, Spencer, F. M. Boyd, of Rosedale, F. G. Gilmore, of Greencastle, T. W. Atchinson, of Terre Haute, W. W. Harbell, of Sullivan.

The next regular meeting will be held Aug. 8, at Linton.

Visitors were highly pleased with the promising conditions of the telephone situation at Brazil and throughout the territory. At Brazil the Citizens Company has 1,200 subscribers, while the Bell Company less than 400, so that this district is not behind the others in Indiana.

PLAN FOR GOVERNMENT-OWNED TELEPHONES FOR ALBERTA ASSUMING FORM.

IN the estimates for the Province of Alberta the sum of $25,000 has been voted for the purpose of doing preliminary work on the establishment of a government-owned telephone service. At the same time Attorney-General Cross introduced a bill to be known as the Municipal Telephone Act, which will empower municipalities to go into the telephone business. The one is evidently the complement of the other. It is clear the government intends to establish trunk lines throughout the province and give the municipalities powers to equip and operate local systems and provide for the harmonious working together of the two systems.

Up to the present time there has been no announcement made by the Alberta public works department as to just what work will be undertaken before the parliament meets again. The municipal telephone act provides that any city, town or organized improvement district may establish, own and operate a telephone system and carry on the business in the same manner as a private company, under the complete powers for this purpose, which the act will give.

The act provides that franchises already granted shall stand, but otherwise the council is given complete expropriation powers, allowing it to cross any land or to put its poles wherever it deems advisable. The municipalities are required by the act to keep separate telephone acccounts, and only in the case of a surplus shall money be taken from the telephone account and placed to public revenue. All telephone rates are to be treated the same as ordinary taxes and are to be collected in the same way. All officers will be appointed and dismissed at the pleasure of the council. Municipalities are given power to levy a special assessment for the purpose of establishing a telephone system and are empowered to borrow, over and above all other borrowing powers, a sum not to exceed half the total revenue which has been received for the previous year.

Clause 26 is the most important in the bill. It provides that: "Every municipality owning or operating any telephone system shall have power to enter, by law, into any agreement with any person, company or municipality, or with the government of Alberta, providing for the erection, establishment and maintenance of a telephone system and for connection, intercommunication, joint operation, reciprocal use or transmission of business as betwen any telephone systems owned by the respective parties, and for such consequent division of profits, or such payment or compensation, or such other financial adjustment between the respective parties as may be necessary or advisable for the purposes of such agreement."

The act practically brings into effect the machinery for the establishment of municipal and government owned telephone lines throughout Alberta. The whole Dominion of Canada and every State in the American Union will watch with the greatest interest the working out of the system in Alberta.

YOU NEVER CONSIDERED TALKING
OUT OF TOWN
BEFORE WE CAME
WHY?
HIGH RATES AND LIMITED SERVICE.

YOUR LONG DISTANCE SERVICE
IS INDISPENSABLE NOW
WHY?
LOW RATES AND UNLIMITED FACILITIES
YOU KNOW WHO
BROUGHT THIS ABOUT.

YOU CANNOT DENY THAT RATES HAVE
BEEN REDUCED 40 PER CENT.

WE CONNECT WITH 75,000 SUBSCRIBERS
THAT CAN BE REACHED BY NO
OTHER SYSTEM

FIVE YEARS AGO TELEPHONES WERE
FEW.

RURAL DISTRICTS ONLY DREAMED
OF TELEPHONES THEN
COULDN'T GET THEM!
BUT IT'S DIFFERENT NOW.

The above statements cover one-third of the length, on the inside, of a folded advertising leaflet issued by the Inter-Ocean Telephone and Telegraph Company, of Buffalo, N. Y. The remainder of this interesting advertising material, furnished by Mr. Wm. A. Wadsworth, will appear in a later issue.

WINONA COMPANY STRATS ON ITS TWELFTH YEAR.

THE Winona (Minn.) Telephone Company recently completed the eleventh year of its existence. It started service with about 175 subscribers, to the number of which it has steadily added until now it has over 1,550 patrons, not including the farmers' lines which accommodate more than 200 rural subscribers.

When the company started business it had no outside connections, being purely a local concern. To-day it is able to connect with practically every point in Minnesota and a great many towns in adjoining states.

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QUERIES

LIGHTNING BURN-OUTS.—(695.)

I have a route in this city which has two separate grounded or ground toll lines on it, also one telegraph circuit, all three single wires. I have noticed that every time we have a lightning storm it gets on this particular route and burns out a few wires in my cable; these grounded lines and telegraph do not go through my cable, but very nearly every time we have these storms it burns out the cable. Would a repeating coil keep down this trouble from the grounded line (which, by the way, comes into this office straight without a repeater)? Will lightning jump from these lines to a metallic line? C. F. L.

There is very little difference between grounded and metallic lines as regards direct effects from lightning stroke for the reason that the carbon plate arrestors necessary to protect instruments cause each wire to act as a grounded line when subjected to lightning stroke. The question of protecting cable from damage by lightning is best taken care of at cable boxes where conductors should be provided with open space arrestors and possibly choke coils to divert the lightning to ground before entering the cable. It is improbable that the use of a repeating coil at the central office would help this trouble, as assuming that the lightning struck one of the grounded lines and then jumped to some of the metallic lines running into the cable, the use of a repeating coil would in no way serve to stop this action.

MARKING MULTIPLE FOR OPERATING PURPOSES.—(696.)

I should be glad to have you tell me some good plan for distinguishing multiple jacks for party lines, etc., on a switchboard by means of paint. What kind of paint is best to use? A. R.

There are several distinguishing marks used in various places, the particular kind depending upon the whim of the person who chooses the mark. It is customary in a large number of companies, however, to distinguish multiples in accordance with the following code: For party lines, a white mark of the form shown above jacks in the upper row in Fig. 696. This indicates the fact that the line is a party line with more than one subscriber connected. The object of this mark is, of course, to enable the operator to ascertain the number of times she shall ring upon a tion. For instance, if the subscriber calls for 409 and this is a party line, the operator will ask him what party he wishes on that line. After receiving the information she is able to ring the correct party in accordance with the code.

There is another mark for consecutive groups, which consists of one stripe of red or light blue paint. Adjacent groups are marked with different colors alternating red and blue. By this

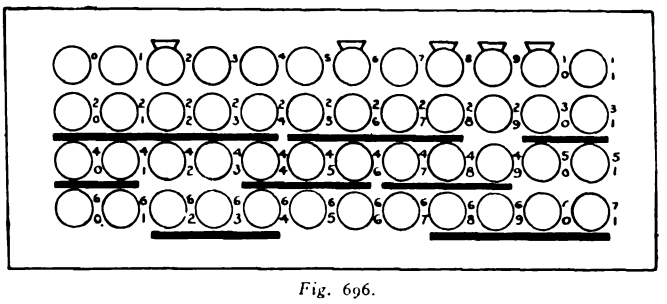

Fig. 696.

scheme when one group of adjacent jacks runs directly into the next group of adjacent jacks a blue mark will be followed by a red stripe, and there is no danger that operators will make an error. If, however, only one color is necessary, it is customary to use red in preference to blue. The object of this scheme is to designate all lines which go to the same subscriber, whether they are lines to individual instruments or P. B. X. trunks. It is considered good practice to group such lines, in order that if one is busy the operator may know, without any tax upon her memory, that the subscriber has a certain number of other lines, and know which these lines are. That is, if an operator receives a call for line 443, and a mark similar to that shown on the third row from the top in Fig. 696, is beneath this jack and several others, she will know that all the lines connected to jacks designated by this mark go to the same person, and she will proceed to test them in succession until she finds the jack which gives no click, indicating that the line is idle. She is thus enabled to complete a call in all cases where all of the trunks are not in use in the minimum time

A green mark is sometimes used to distinguish jacks connected to automatic pay stations.

A very convenient paint for this purpose is the sort that comes in small metallic tubes similar to those used for the familiar photograph mounting or office paste mucilage; Windsor & Newton's paints of this class may be obtained almost anywhere, and are considered standard. One tube each of verdigris (green), flake white and Chinese vermillion should be purchased. The blue shade can be obtained by mixing the verdigris with the flake white. In applying the paints to the jack mounting strips, they should be mixed with liquid dryer, and put on with a fine brush.

SECRET CALLING OF CENTRAL OFFICE.—(697.)

Will you please inform me if there is any standard scheme for calling an exchange without letting the other subscribers on the line know that the central office has been rung? R. L. J.

One standard method of accomplishing the result you mention

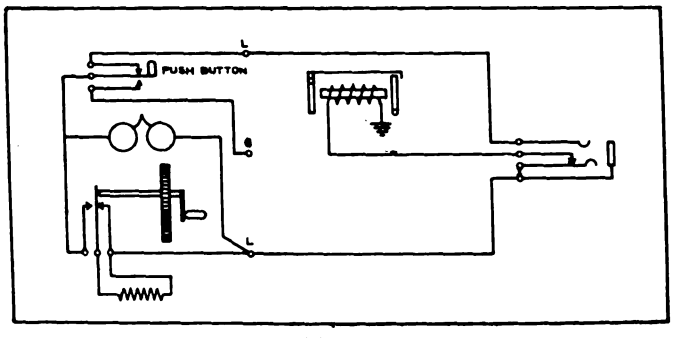

Fig. 697.

is by the use of a push button in the telephone, which is used to bring into operation a grounded signalling scheme. Referring to Fig. 697, the subscribers' station is wired as a regular bridging telephone, except that a push button is inserted in such a way as to connect one side of the instrument normally to the line and to ground when operated. Normally when the subscriber rings, the current from this generator passes out to both sides of the line, and all other bells upon the line are rung, thus enabling him to call other subscribers on a party line by code ringing. On the other hand, if the subscriber wishes to call the central office he presses the button and a current from one side of his generator passes to ground, and from the other side out through binding post L to the sleeve side of the line, from which it passes through the contact of the jack to the drop, one side of which is grounded, thus establishing a complete grounded circuit. It will be observed that when he has finished ringing the push button flies back to its normal position, and a complete metallic circuit is re-established ready for talking; and when the central office operator plugs in, the mechanical contact of the jack is opened, thus freeing the line from the grounded drop, which would tend to unbalance it to an extent which would cause undesirable noise if it were connected up to a toll line. This noise, of course, would not exist on a party line upon which two subscribers are talking to an extent which would cause appreciable annoyance in the average town.

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(*Continued from page 321.*)

actly, the cable would have to be made up of 5 pairs for talking, 5 single wires for the busy test, and 5 additional single wires for the signals. In actual practice, however, the regulation answering jack cable having but four, this capacity is frequently used, and is split between four strips of jacks. For the toll line multiple, the same cable is used again, and is split between two strips. By this means the actual number of cables used is kept as low as possible. In addition to those already named, there are special cables, which are used under various conditions.

For use in connection with switchboards in which long toll lines are handled, it is customary to use cables in which the conductors are made of No. 19 B. and S. gauge wire, instead of No. 22; the object being to reduce the resistance of the conductor to as low a figure as possible. It is advisable, however, to use this class of cable in offices where the number of lines accommodated is small. Since the increased size of conductors augments the cross-sectional area of the cable, thereby increasing the room occupied, a recent type of cable has for its object the reduction of the conductor resistance with as little increase in the cross-sectional area as possible. To accomplish this end, the talking conductors are made of No. 19 Band S. gauge wire, while the single wires are made of No. 22 gauge.

There is another class of cable which, while it is used almost exclusively for exchange work, still partakes of the nature of cables used for outside construction. This is a cable in which the insulation is of wool. The conductors are of No. 19 B. and S. gauge soft drawn wire, and are twisted together in pairs in the usual way. The insulation consists of one coating of wool braid. The pairs are laid up in reversed layers and are bound together with woolen yarn. Over the whole is placed a lead sheath having a thickness of ⅛ inch. This type of cable is used to terminate lines on the main distributing frame, a short length being spliced to the end of the paper cable, to make runs between the main and intermediate distrbuting boards, where the two are on different floors, and the nature of the building construction is such that the run is to be made in ducts along the walls; where the ordinary type of switchboard cable would be too expensive to use; and where the liability to abrasion in drawing in is such, that the protection of a lead sheath is required. This cable possesses an advantage over the paper insulated cables in that no pot heads need be made. In terminating this cable, the lead sheath is cut away for the required length and the pairs formed up in the usual way. The form is then boiled out in wax, and shellaced, and the conductors are soldered to the lugs. The capacity of this class of cable is high; but since the lengths in which it is used are short, this defect is not of a serious nature.

It is claimed that in warm, damp climates, this cable is not desirable on account of the tendency of the wool to absorb moisture. And on this account its use has been condemned in some quarters, and some companies go so far as to reject it altogether. But if properly terminated, and the forms thoroughly boiled out, this defect is more appearent than real. The author has personal knowledge of an exchange in one of the large Atlantic seaboard cities, where dry air is certainly not prevailing, in which this type of cable has been in use for five years, and the "trouble" on it has been nil.

The Cost of Cables.—The approximate cost of cables can be figured out by means of certain formulas depending upon the nature of the materials of which the cables are made. And also upon the character of the machinery employed in the manufacture. The following rule is useful in figuring the cost of a lead sheath, unarmored cable. It has been found by experiment that the cost of the lead sheaths per foot, is 38 cents; to this add the actual cost of copper,based upon the number of conductors and their diameter. This sum must be multiplied by 1.5 to account for the labor, and the cost of material used in insulating and in serving. The cost of stringing aerial cables, or laying underground cables, can be figured from the following data: In the case of aerial cable, the first work is to string the suspension strand, or messenger strand, as it is sometimes called. In figuring the cost of this piece of work it is safe to assume that a gang of eight men and foreman can string 5,000 feet of guy strand in one day. This figure is sometimes exceeded, and sometimes not reached, but for average work it is a safe assumption. The same gang can also string 5,000 feet of cable in one day. When underground cable is to be laid, the first work is to rod the duct, unless it is already threaded by wire. Assuming the length of sections from manhole to manhole to be 300 feet, one man can rod 10 sections in one day.

In drawing in lengths of underground cable it has been found that a gang of eight men and a foreman can draw in 5,000 feet of cable in one day; so that this figure may be assumed as the one from which the calculations are to be made. In figuring on the cost of splicing, it is well to assume that one splicer and a helper can make one splice per day. Where 50 pair cables are drawn in, sometimes this figure has been exceeded. The length of time taken to make pot heads is the same as that required for splices. As to the amount of material required on the work, the following facts will be useful. As to paraffine used in boiling

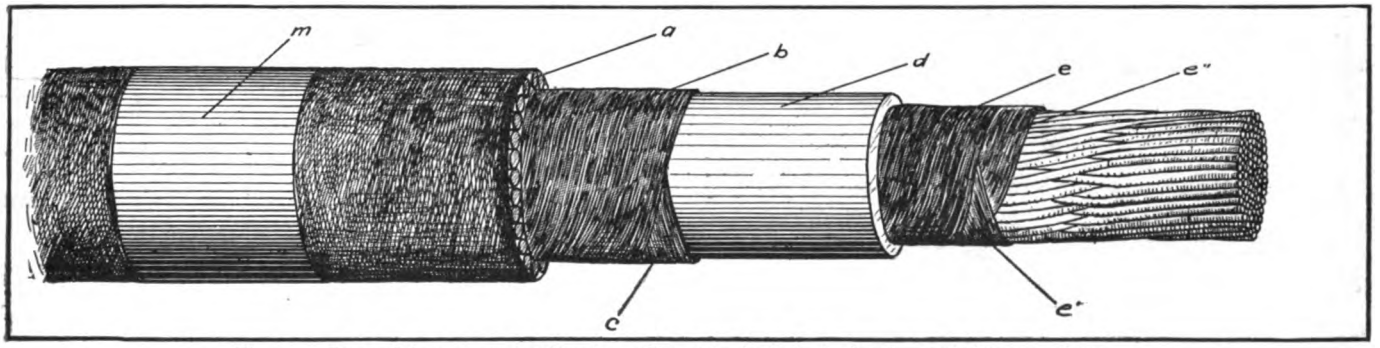

Fig. 14. Type of iron-armored submarine cable with single lead sheath and jute wrappings.

out splices it is usual to allow 2½ pounds per splice. In wiping joints 5 pounds of wiping metal are allowed per splice, and about 2½ pounds per pot head. The amount of sleeving that is required for insulating the spliced joints can be determined in the following manner. Allow 3 inches as the length of each sleeve, then the total number of inches of sleeving needed will be $3 \times N \times n$ where N denotes the number of conductors in the cable, and n denotes the number of splices and potheads. One item which is very important, and which is sometimes overlooked, is that of trucking. The cost of trucking depends upon a great many local conditions, such as the distance of the line from the nearest shipping points, the length of the line, and the character of the roads. As a general thing, it is cheaper to truck in a city than on the suburbs or country, because the distance from the stable to the shipping point, and the average distance from the shipping point to the points of delivery are shorter and the roads are apt to be in better condtion.

It will be found that in the long run one truck can cart 3 reels, 12 miles in one day. To determine, therefore, the number of days required to do the trucking, the total distance to be covered must be computed in miles. By dividing this figure by 3 the number of days required to do the work are obtained.

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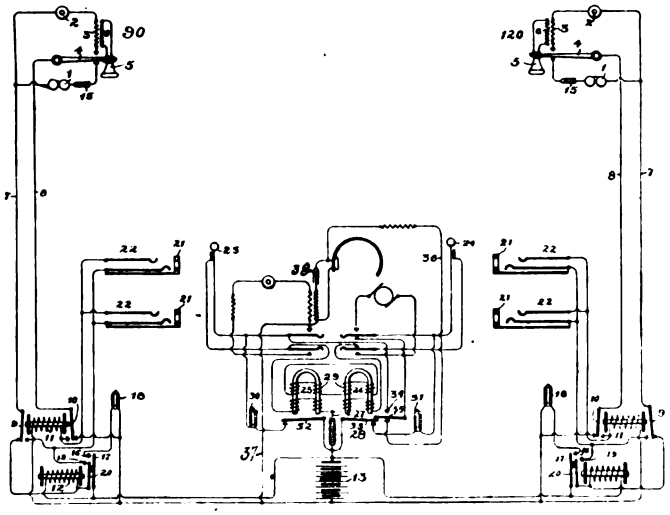
TELEPHONE PATENTS

TELEPHONE SYSTEM.

William M. Davis, Chicago, Ill., patents (No. 816,078; dated March 27, 1906; filed August 5, 1901; serial No. 70,924) and assigns by mesne assignments to the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., a telephone exchange system.

The objects of this invention are to provide means for operating the cut-off relay without a third conductor, and also to connect the thimbles of the line jacks with a test circuit which immediately becomes operative upon the removal of a receiver from a hook, thereby preventing the connection of another line to a calling sub-



scriber's circuit in the interim between the display of the line signal and the insertion of the answering plug by the attendant operator. Referring to the illustration, when a receiver is removed from a hook a circuit is formed from the negative side of the battery 13 to the closed contact 10 of cut-off relay 11, wire 8, substation apparatus, wire 7 armature contact 9 of cut-off relay 11, line relay 12, back to battery. The line relay is thereby energized, closing signal contacts 16, 17 and test circuit contacts 19, 20, effecting the display of the signal 18 and connecting the sleeve thimbles of the line jacks with the positive side of the battery. The line under these conditions will show a busy test.

When a subscriber is called, the insertion of the calling plug 24 in the line jack closes a circuit from the negative side of battery, armature 33, supervisory signal 31, tips of plug and jack, winding of cut-off relay 11, back to battery and thereby operating the cut-off relay and opening the line signal circuit. At the same time the supervisory signal 31 is illuminated. When the subscriber answers a circuit is completed from the negative pole of the battery, retardation coil 28, winding of relay 26, sleeves of jack and plug, armature 9, substation apparatus, armature 10, and through winding of cut-off relay to battery. The supervisory relay 26 is then actuated, the supervisory signal circuit is opened, and the sleeve strands of the answering and calling cords are connected together. The sleeve strands are separated to prevent the calling subscriber being annoyed by the test clicks incident to the connection of his line to that of the desired party. The repeating coil windings 29 of the relays 25, 26 serve to connect the two halves of the sleeve circuit.

TELEPHONE SYSTEM.

Daniel Maclauchlin Therrell, Charleston, S. C., patents (No. 815,322; dated March 13, 1906; original application filed July 23, 1904; serial No. 217,846; divided and this application filed August 2, 1905; serial No. 272,375) a telephone system.

The object of this invention is to increase transmission efficiency over long lines. This the inventor accomplishes by designing the substation apparatus to overcome the impedance of the primary coil so as to secure larger primary currents; by maintaining a higher mutual inductance and thus obtaining a higher efficiency of transformation; and by adjusting the secondary system to generate a larger line current at a higher effective line potential.

In the preamble to this patent the inventor states that from researches he has made it is his opinion that little is to be obtained by tuning or readjustment of the line constants in so far as long aerial lines are concerned operating under conditions that might be called existing meteorological conditions.

An elementary understanding of the methods involved can be gained from an examination of Fig. 7. The battery 2 is connected in multiple with the transmitter 1, and the primary 5 of an induction coil in series with a condenser 6. A decrease or increase in the resistance of the transmitter will cause discharge or charge of the condenser, the discharge taking place in the direction of the arrows when the transmitter resistance is lowered. From this operation it will be readily seen that the current passing through the primary winding 5 is alternating in character. This, the inventor claims, results in higher transformer efficiency and better definition of wave form by permitting the use of a greater amount of iron in the core.

In Fig. 9 two primary coil circuits 5, 7, are shown in connnection with condensers 6, 8, and inductances L_1 and L_4. The principles of operation are the same, but a greater efficiency is secured.

In connection with the transmitting circuit the inventor pro-

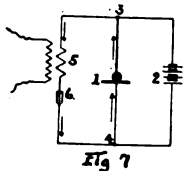


Fig 7

vides besides the requisite secondary coil windings 9, 10, compensating transformers Tr_1 and T_2. These are employed to raise or lower the line voltage, and by proper adjustments of their constants of transformation the original potential of the source can be maintained while reducing the internal impedance to incoming currents as a result of the shunt to them through coils 15, 16.

At B but one transformer is shown, the inventor claiming that equal efficiency is obtained.

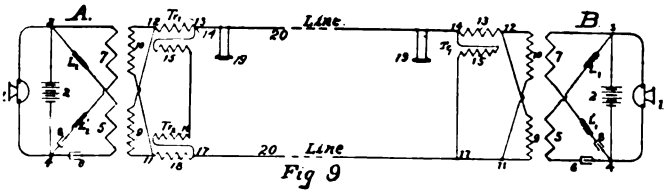


Fig 9

In summing up the results of such circuit construction the inventor claims that a net gain of 100% in the efficiency of the receivers 19 is obtained, and, taking other factors into consideration, a gain of at least 200% is secured above old methods of transmission.

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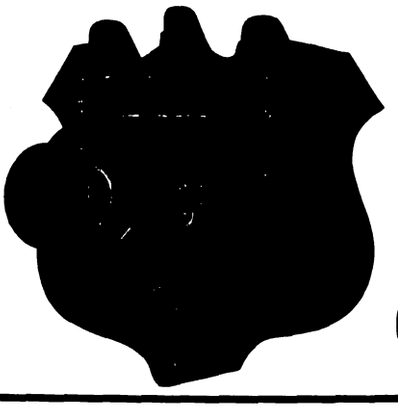
Don't Hesitate

About Discarding Those Stations

With Getting Out of Order Parts

Others Had To



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FOR SALE—Switchboard and apparatus, outgrown and displaced by automatic equipment: Kellogg switchboard, twenty 8-panel, 3-position, mahogany, equipped for 5,200 main lines, ultimate capacity 6,000 lines; Kellogg toll board of 9 positions; Kellogg telephones, 4,064 wall and 2,136 desk; Sterling terminal rack, with protection; power plant, with charging and ringing machines and storage batteries; offered for sale in whole or in part. For particulars address The Columbus Citizens' Telephone Company, Columbus, Ohio. 548

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Capable wire chief, one with experience, for testing cable trouble, etc., in an exchange of about 1,500 subscribers. State age and experience. Address, Box 610, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 610

YOUNG MAN possessing experience and ability desires position as manager with a progressive company. Would be willing to consider a proposal offering part interest in return for services. Address Box 612, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 612

WANTED—Position in auditing department. Capable of installing system of accounts. Also, position for experienced contract agent and adjuster. Address Box 601, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 601

WANTED—At once, two first-class Independent solicitors for work in Missouri. Salary at beginning depends upon references. Address Box 409, St. Joseph, Mo. 602

WANTED—Position as manager. Can furnish best of references. Am at present manager of an exchange of 1,000 subscribers. Would take some stock. Address, Box 609, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 609

THE FOUNDATION of our business lies in the fact that we are successful in placing men speedily and satisfactorily. Our trained experts know just which men to select for each particular position. Investigate to-day the advantages and facilities we offer. Hapgoods, suite 511, 309 Broadway, New York City. 464

POSITION wanted with a manufacturing company in the advertising or sales departments, by a young man with energy, experience and ability. No reasonable offer refused provided there is opportunity for advancement. Address Box 613, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 613

WANTED—Position as manager in exchange of 1,000 subscribers or less. Have had five years' experience in telephone business and am graduate of International Correspondence Schools. Best of references. Address Box 597, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 597

TO BE FOREWARNED IS TO BE FOREARMED

If you are not using a measuring instrument to test your lines, get one at once, as you will need it many times before the summer comes. It would be just as sensible for a grocer to try and sell sugar by guessing at its weight as it is for you to try to locate a fault in a line by the same method. PIGNOLET VOLT-AMMETERS are designed to give the best results required for testing purposes. They are not complicated nor do they require experts to operate them. Another point in their favor is their low cost. There is no instrument on the market which will give you as accurate results at anything near the price. Hadn't you better write for prices and further particulars? By buying one now you will save its cost many times over before you have had it a year.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

GALVANIZED IRON WIRE.

TESTS of its galvanized wire by several leading technical schools, and the experience of numerous telephone companies are relied upon by the Indiana Steel & Wire Company, of Muncie, Ind., to give force to its statement that it is putting upon the market a wire that will give the highest degree of satisfaction to its users.

The company states that its wire is never rough, and does not crack in splicing. It is tough, strong and pliable, and yet has a very high conductivity. The improved continuous process for annealing galvanized wire which the company employs insures an even temper and a thorough galvanization, without producing burnt or rotten places in the wire, which cause weak spots that will make the wire break very easily in cold weather. As a result of the uniform satisfaction which has been experienced with a wire in which the above claims are justified, the company states that its factory has been running day and night since September 1st. Some of the leading jobbers are handling its wire, and many telephone companies have signified their intention to use its product exclusively in the future.

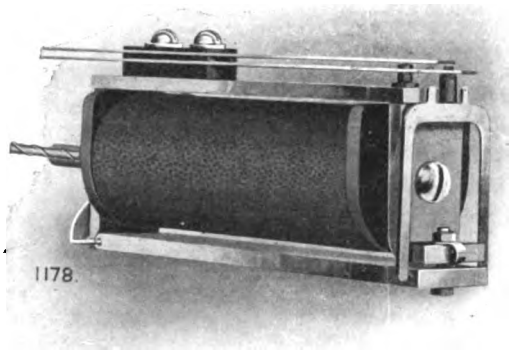
The company has some interesting printed matter which gives standard specifications and the actual results of tests upon its wires, together with recommendations from leading telephone companies, which it will be pleased to send to those who forward a request for this information.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., is distributing a booklet containing a large number of letters from telephone men who have used its preservative Avenarius Carbolineum and recommend it. During the thirty years this preparation has been on the market ample time has elapsed to prove its wood preserving and strengthening qualities. The company claims it is cheaper than ordinary paint and is therefore of great value in painting cross arms, pole roofs, gains, pins, and pole butts. Further information relative to price and guarantee will be furnished by the company.

THE CONNECTICUT TELEPHONE & ELECTRIC CO., Meriden, Conn., has brought out a new intercommunicating system, using its No. 35 B automatic instrument. The manufacturers claim this system to be non-interfering. It operates with a common return wire and centralized battery for talking and ringing. Diagrams of the circuit and other information will be mailed on request.

THE AMERICAN CONDUIT COMPANY has announced the removal on May 1, 1906, of its Chicago offices to more central and more commodious quarters in the Marquette Building. Mr. A. L. Waterbury, General Manager of the Sales Department, will be glad, as in the past, to receive the friends and patrons of the company at the new office, and all inquiries by mail or otherwise will receive prompt and careful attention.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has recently installed a common battery private branch exchange for the General Railway Signal Company, Buffalo, N. Y., and a number of private branch exchange systems have been furnished and installed for the Frontier Telephone Company, of Buffalo, N. Y., which has also adopted the Century No. 85 Common Battery Desk Set throughout its entire system.



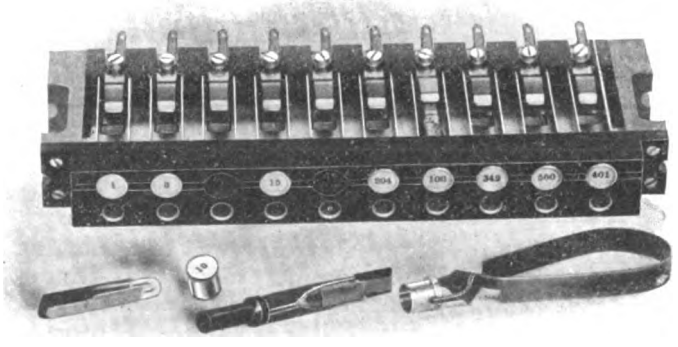
Line Relay Used on the Stromberg-Carlson Lamp P. B. X. Board.

BRANCH EXCHANGE EQUIPMENT.

THAT the proper equipment of the switchboard is most important in securing efficient service is shown very clearly to be the principle which has actuated the design of the apparatus for the Stromberg-Carlson branch exchange.

For line equipment the company recommends its standard arrangement for a lamp switchboard. The jacks and lamps are mounted upon strips, as shown in the illustration upon this page. The lamp signals are one-third candle power, and are lighted when the subscriber removes his receiver from the hook. When the operator plugs into the jack corresponding with the lamp, to answer, the line signal is extinguished.

Lamp jacks are mounted immediately above the corresponding answering jacks. Each lamp is provided with an individual lamp cap, which combines the feature of a designating number with that of covering the lamp. These caps are furnished in various styles to meet the taste of the purchaser.



No. 82 Combined Lamp and Answering Jack Strip Used in Stromberg-Carlson Lamp P. B. X. Board.

The company states that the lamp signal is somewhat more expensive than the visual, which can also be furnished if desired, but that it is well worth the increased cost. Being operated by a relay it is more flexible, and can be adjusted more readily than any other type of signal. Moreover it is less liable to become injured whenever additional equipment is added. It goes without saying that it is more easily distinguished than any other type of signal, and by reason of the close proximity of the lamp and jack greater speed in operation may be attained.

The line jacks are of the double cut-off type. The operator upon plugging in cuts off from the line all auxiliary apparatus. This enables her to obtain for the talking circuit a clear metallic line, unencumbered by apparatus of any sort, which insures the most effective transmission. The design and workmanship of these jacks are of the very highest order.

The line relays, the type of which is shown in the upper illus-

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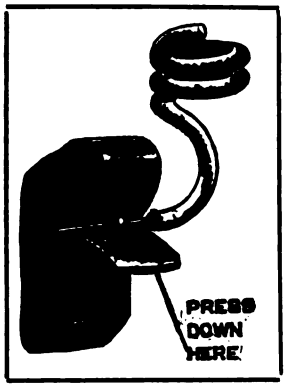

what you ask for. Undoubtedly you won't have any trouble in buying batteries equipped with

Fahnestock Spring Binding Posts

But to save time in connecting the batteries, to save money in lower maintenance charges, and to save trouble because they don't cut the wires and cannot shake loose or corrode, be sure to

Specify Them in Your Order

Remember, they don't cost a cent more, and all battery manufacturers equip batteries with them when requested.

Sample Post Free. Write for it.

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Be Right at the Start

by using a Standard System of Records and Accounting. In this way you will always have the details of the business within your grasp. We have devised and copyrighted a System which covers every phase of the business from the preliminary work of incorporation down to the actual operating records. We print every item of stationery necessary:

Special Lithograph Telephone Stock Certificates, Lithograph Bonds, Incorporation Records, By-Laws, Lease and General Ledgers, Toll Records, Bills, special forms of every description made to order, Toll Tickets, Voucher Checks, Letter Heads, Envelopes, etc.

Besides these, we manufacture Filing Cabinets for every purpose and also electrotypes of the national emblem in 17 different sizes for one or two color work.

All inquiries receive prompt and courteous attention and we solicit them even if you are not at present interested sufficiently to give an immediate order.

Write for Catalogue and Descriptive Booklet.

Telephone Systems Department

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PREMIER "BB"
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Manufacturers of
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Standard Wood Preserver of New York Central Lines, American Telephone and Telegraph Company and other large Corporations.

Guaranteed to double the life of poles with proper application. Comes ready for use, anyone may apply it with a brush or by dipping; no skill nor machinery required.

Enables substitution of cheaper grades for expensive poles.

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CARBOLINEUM WOOD PRESERVING CO.

Sole U.S. Agents Milwaukee, Wis.

Beware of substitutes offered under similar names for easily discernible reasons.

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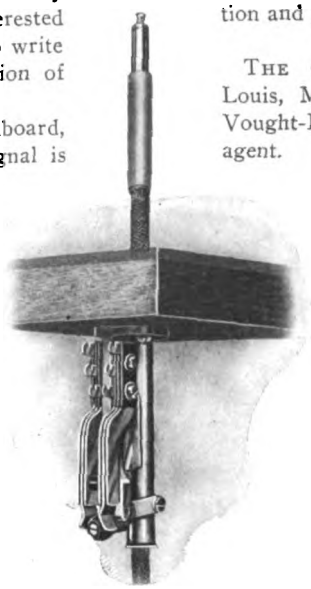
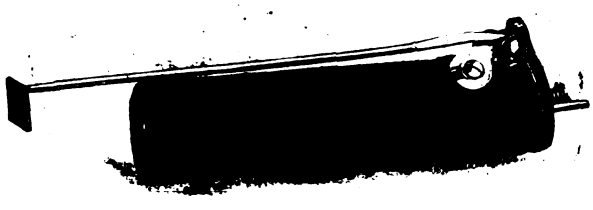
tration, are mounted in strips of ten or twenty on a steel framework in the upper part of the cabinet. The operation of the relay is very positive, and its adjustment to whatever requirements may properly be expected of it is easily accomplished. From the standpoint of design this relay presents a great many extremely attractive features, and those who are interested in it from a technical point of view would do well to write for the bulletin which contains a detailed description of the apparatus.

For those who object to the lamp type of switchboard, for its cost or any other reason, the visual line signal is provided. This is very simple in construction, as is made evident by the accompanying illustration. It consists of a tubular drop with an aluminum vane fastened to the end of the armature rod. The company states that this signal has been thoroughly tried out in practice and operates in a very satisfactory manner. Although very simple, it is not as easy to adjust or remove from the board as the lamp signal. An interesting and attractive arrangement of equipment in the cabinet is made when this type of signal is furnished. A glass plate is mounted in the upper part of the cabinet above the jack space. This plate is provided with alternate spaces of ground and clear glass. The signals are mounted in strips immediately behind the ground glass, and in such a way that the aluminum vane will not be visible in its normal position, but will appear in the clear glass space when lifted by the energization of the magnet at the time subscriber calls. The signals are automatically restored when the operator answers.



Stromberg-Carlson Plug Switch for P. B. X. Switchboards.

In order to secure practical double lamp supervisory signals, the company has introduced a device which does away with the use of a three conductor cord or a ground. This is a plug switch used with the calling cord and constructed as shown in the upper illustration on this page. This piece of apparatus has been used with much success on both large and small switchboards, and is said to be absolutely positive in operation. The great advantage derived from this practice is that the lamp signals are positive in operation; that is to say, the lamp lights when the connected subscriber hangs up his receiver in the same way as on a regular central office switchboard. This method of supervision enables either subscriber to signal the operator for a disconnect signal or a new connection at any time he wishes.



Type of Magnetic Visual Signal Furnished with Stromberg-Carlson P. B. X. when Specified.

Although the line and supervisory apparatus present the most attractive points of individuality, the other material used upon the switchboard is very interesting and well worth the attention of persons who are seeking information on this type of apparatus. The company has issued a very attractive bulletin, to which has been assigned the number 14, describing this apparatus and its standard cabinets. It will be pleased to forward this bulletin to all those who make request for information on branch exchange equipment.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, 610 Woodford avenue, Plainville, Conn., is sending out leaflets which show a new type of Ironclad Service Switch. The new switch is of the well known Trumbull type, mounted upon a special porcelain base, which is provided with cutout sockets. The special feature is an iron box, which permits the location of the switch in places where if exposed it would be unsafe on account of dampness, presence of inflammable material, liability of short circuiting and numerous other objections. The use of this special enclosed switch will save the extra expense of running wires from the outlet to a safe position. Further information and prices will be cheerfully furnished by the company.

THE COMMERCIAL ELECTRICAL SUPPLY COMPANY, St. Louis, Mo., is distributing a pamphlet illustrating the Vought-Berger telephone apparatus, for which it is the agent. Half-tone engravings of common battery and magneto instruments are given, besides one of the familiar "President" telephone. The company has a catalogue which lists many articles of use to telephone companies and will send copy free of charge upon application.

THE NORTH ELECTRIC COMPANY, of Cleveland, O., opened on May 15th a branch office and warehouse at Kansas City, Missouri, where it will carry a large stock of telephones of all kinds, switchboards, construction material, and miscellaneous supplies.

This branch is in addition to the Dallas branch office and warehouse at Dallas, Texas, and is made necessary in order to take care of the rapidly increasing business in the States adjacent to Kansas City. The company will be prepared to make prompt shipments from its Kansas City warehouse after May 20th.

The Chicago office of the North Electric Company has been discontinued. Business west of the Mississippi will be handled from the Dallas and Kansas City offices and warehouses, and that east of the Mississippi River will be handled as heretofore from Cleveland.

TELEPHONE BONDS, STOCK CERTIFICATES AND STATIONERY.

AT this season of the year many telephone companies are making their financial arrangements. Funds are being sought to construct new toll lines or exchanges or to retire present liabilities.

It is a well known fact in financial circles that if the stock certificates or bonds which are to be issued are printed on fine, lithographed or engraved stock, they are much more easily sold. This is probably for the same reason that a well dressed salesman will command a better and more respectful and ready hearing.

Quick to grasp the need of something appropriate for the telephone business, the Edwards-Hine Company, of 5 and 7 Pearl street, Grand Rapids, Mich., has designed and placed on the market several attractive forms of stock certificates, and also a very unique bond to which are attached the annual, or semi-annual, interest coupons for whatever period of time the purchaser may desire.

All of this company's special forms show the national shield emblem in two colors in a very attractive manner.

It also carries fine lithographed stock stationery, and voucher checks, embellished with the shield emblem in colors and a telephone instrument making a very attractive presentation for any company. Samples can be procured upon application as well as a full description of telephone accounting and filing systems.

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CORDS : CABLES WIRES

We Manufacture

Cords for Telephones and Switchboards : : :
Cables and Wires for Switchboards : : :
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SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

An Analogy in Meat

When a butcher places a piece of meat upon his scales to determine the amount he establishes a balance by means of pound and ounce weights. Suppose he used only the even pound weights and guessed at the odd ounces; he would either cheat himself or his customers.

In selling toll service, a clock takes the place of the scales and weights. But an ordinary clock will not tell exactly how long a line has been in use; hence when an operator computes the time of a conversation, the result is a time period based generally upon a guess.

On the other hand, if a CALCULAGRAPH is employed, a record of the elapsed time in minutes and quarters is mechanically made which is correct and indisputable.

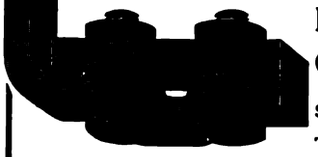
It Makes No Clerical Errors

Write for particulars.

The CALCULAGRAPH CO.
1437 Jewelers Building, NEW YORK CITY

JUST TO REMIND YOU

when buying your cable construction hardware that we make the best that is to be had.



This cut shows our PATENT COMBINATION MESSENGER HANGER for straight lines and corners. There will be no cutting of the strands where the messenger makes a sharp turn if this hanger is used.

Made of forged steel in three sizes, for light, medium, or heavy construction, and furnished with either Japan or galvanized finish.

We make other styles of Messenger Hangers, besides clamps and brackets. Also four different types of cable hangers, pole rings, steps and bolts.

Write for catalogue and prices.

NORTON TOOL CO.
WEST PARK, OHIO. Electrical Department

BATTERY REASONS WHY

Because of absolute, lasting merit, emphasized in the most thorough tests known to the electrical world, the

ROCK ISLAND
NEW PATENT
DRY CELLS

have taken *first* rank among dry batteries. Zinc two grades heavier than that used by others, and carbon vastly superior in quality—are factors in the creation of

THE HIGHEST VOLTAGE.

The *life* of a Rock Island New Patent Battery is 20 to 30 per cent. longer than those imitations offered with the misleading label, "Just As Good." The result of competitive examinations gives us the right to PUT THAT STRONG.

Our Standard No. 8 has received highest endorsement from Telephone Manufacturers and Telephone Companies as the battery for reliably long service. Standard No. 6 is the regular size.

Write Department D for prices.

ROCK ISLAND BATTERY CO.
Ninth & Sycamore Sts.,
CINCINNATI, OHIO

R·I BAT

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THE WEEK'S MESSAGES

FINANCIAL.

FT. WAYNE, IND.—The Home Telephone and Telegraph Company, of Ft. Wayne, has increased its capital stock from $250,000 to $600,000.

LEXINGTON, KY.—The Fayette Home Telephone Company has declared its regular quarterly dividend of 1¼ per cent. on its preferred stock.

NEW ULM, MINN.—The New Ulm Rural Telephone Company is to declare a dividend of 6 per cent.

RAVENA, N. Y.—The Ravena and Medway Telephone Company, Ravena, has declared a dividend of 5 per cent.

WATERVILLE, N. Y.—The Waterville Telephone Company has declared a dividend of 9½ per cent. on its capital stock.

NEW PHILADELPHIA, O.—The Tuscarawas County Telephone Company, of New Philadelphia, has increased its capital stock from $200,000 to $350,000.

MARION CENTER, PA.—The Farmers' Telephone Company is to increase its capital stock from $15,000 to $25,000. The company expects to make many improvements in its system.

UNION GROVE, WIS.—The Union Grove Telephone Company has increased its capital stock from $2,000 to $5,000.

FRANCHISES.

MT. CARROLL, ILL.—The Farmers' Mutual Telephone Company has obtained the franchise for which it made application in Mt. Carroll some weeks ago.

JEFFERSONVILLE, IND.—The Home Telephone Company has applied to the Board of Public Works for a franchise to establish an exchange. If the franchise is granted the new plant will connect with the New Albany exchange, and with the lines of the Louisville Home Telephone Company.

FREDONIA, N. Y.—The Home Telephone Company has been granted the right of way for a toll line from Fredonia to Cassadaga. At Cassadaga it will meet the Inter-Ocean line to Jamestown, making a direct line from Fredonia to Jamestown.

GEORGETOWN, O.—The Georgetown Council has granted a franchise to the Independent Telephone Company.

PAWTUCKET, R. I.—The Home Telephone Company, formerly the New England Shaver Telephone Company, has been granted a franchise at Pawtucket.

HILLSBORO, TEXAS.—The City Council has granted the Independent Telephone Company a franchise in Hillsboro, for which it made application some weeks ago.

COMBINATIONS.

DOTHAN, ALA.—The Standard Telephone and Telegraph Company has purchased the Ghent Telephone System.

MATTOON, ILL.—The merging of the telephone systems of Oakland, Kansas, Barton and Redmon into the Embarras Telephone Company, with a capital stock of $45,000, has been completed. The officers are: President, E. N. Blair; vice-president, J. H. Henn; treasurer, George Kirkpatrick; secretary, J. D. Noel.

CEDAR RAPIDS, IA.—The Cedar Rapids Gas and Electric Light Company has purchased the Missouri Electric Light and Telephone Company for $75,000.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company, of Grand Rapids, has acquired the property of the Reed City Telephone Company.

SYRACUSE, N. Y.—A contract has been closed by Daniel G. Gates with the Independent Telephone Company by which the telephone line known as the Madison-Onondaga will hereafter connect with the Independent instead of the Bell system. The Gates line serves Fayetteville, Manlius, Eagle Village and Chittenango.

ELECTIONS.

COLUMBUS, GA.—The Columbus Automatic Telephone Company has elected the following directors: Clarence Brown, Toledo, O.; F. B. Gordon, L. G. Bowers, John T. Norman, Rhode Browne, B. T. Brooks, J. W. Blackmon, Banks Yonge, E. W. Wood, J. B. Huff and T. E. Blanchard, of Columbus.

FREEPORT, ILL.—The Freeport Telephone Exchange Company has elected the following officers: President, Dr. Mease; vice-president, W. A. Hance; secretary and general manager, L. A. Herrick; treasurer, E. T. Morse.

CARROLTON, IND.—The Carrolton Telephone Company has elected the following directors Chas. Dalrymple, C. P. Davis, J. Strahl, Chas. Vetters and Edward Allen.

SLOAN, IA.—The Farmers' Mutual Telephone Company has elected the following officers: Lon Ingham, president; Wm. Worstall, secretary; D. W. Bowers, treasurer.

NEW ULM, MINN.—The New Ulm Rural Telephone Company has elected the following officers: President, Philip Leisch; vice president, Alex Russell; secretary, F. H. Krook; treasurer, Otto Schell.

RAVENA, N. Y.—The Ravena and Medway Telephone Company has elected the following officers: President, W. C. Harden; vice president, Arthur Hartt; secretary, Ernest L. Haight; treasurer, Harrie McK. Curtis.

LOCK HAVEN, PA.—The Sugar Valley Telephone Company has elected the following officers: President, J. I. Shaffer; vice president, H. A. Lamey; secretary, N. D. Tyson; assistant secretary, George Grieb; treasurer, Harry Welshans.

WAYNE, PA.—The Wayne-Monroe Telephone Company has elected the following officers: President, G. F. Waters; vice-president, L. S. Cuyler; secretary and treasurer, J. L. Transue.

FORRESTON, ILL.—The Mutual Telephone Company, of Forreston, has been incorporated with a capital stock of $3,000. Those interested in the new company are Henry and William J. Zumdahl, Ed. and Henry Ratmeyer, Hiram Meiner and Joseph Duitsman.

HERRICK, ILL.—The Herrick Limited Telephone Company, Herrick, has been incorporated with a capital stock of $2,500. The incorporators are A. L. Chamberlain, Harry Hinton and W. Wooters.

NEW ATHENS, ILL.—The Dutch Hill Telephone Company, New Athens, Ill., has been incorporated with a capital stock of $480. The incorporators are John H. Feurer, Peter Knewitz and Henry Wildy.

NEW COMPANIES.

OAKLAND CITY, IND.—The Oakland City Telephone Company, of Oakland City, has been incorporated with a capital stock of $10,000. The directors are C. F. Stevens, Carl Chambers, Alvin Wilson, V. W. S. Trippett, R. F. Mason, J. M. McGowan and John Vandeveer.

DURHAM, IA.—The Plymouth Farmers' Mutual Telephone Company has been incorporated, with its principal place of business at the McMillan School House, Clay Township, Marion County, Ia., with the postoffice address of Durham, Ia. The company will construct and operate telephone lines within the State of Iowa. S. S. Woody is president, and W. U. Harvey, secretary.

RALSTON, IA.—The Ralston Telephone Company has been incorporated with a capital stock of $2,500. Officers are Geo. W. White, president; Geo. W. Wood, Jr., secretary and treasurer; H. S. Olds, manager. The company has bought the plant formerly owned by H. S. Olds, and will enlarge the same and own toll lines to Glidden and Scranton. The company is also putting up an exchange building.

HUNNEWELL, KAS.—The Alpha Mutual Telephone Company, of Rock Falls township, Kay county, with post office address at Hunnewell, Kas., has been incorporated with a capital stock of $100. The incorporators are Ed. Lindsay, D. F. Gilmer, J. Burgett, T. M. Gray and J. O. Lucas, Kay county, Kas. P. O. address Hunnewell, Kas.

ELKTON, KY.—The Independent Telephone Company, of Elkton, Todd County, Ky., has been organized with a capital stock of $50,000. The company will build lines throughout the whole county.

CRIDER, MO.—The Citizens' Telephone Company has been organized at Crider. The company will build a line from Crider to West Plains by the way of Pottersville.

SARCOXIE, MO.—The Sarcoxie Telephone Company, Sarcoxie, has been incorporated with a capital stock of $5,000. The incorporators are H. B. Boyd, B. Pile, B. W. Alley, Harry Bean and H. F. Boyd, all of Sarcoxie.

UNIONVILLE, MO.—The Putnam County Telephone Company has been organized with a capital stock of $24,000. The following officers have been elected: President, E. N. Monroe; vice-president, H. L. Holman; treasurer, L. P. Roberts; secretary, G. E. McCutcheon; business manager, J. H. Holman.

HENDLEY, NEB.—The Spring Green Telephone Company of Furnas county, with its principal place of business at Hendley, has been incorporated with a capital stock of $4,800. The company will build and operate telephone lines in Hendley and surrounding towns. The incorporators are W. T. McKinney, Albert Martin, B. E. Schellenbarger, C. H. Drier and J. H. McKinney.

STEAMBURG, N. Y.—The East Steamburg Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are Frank Anable, Charles L. Bond, Wm. P. Ballard, Trumansburg.

SOUTH BUTLER, N. Y.—The Butler Independent Rural Telephone Company has been incorporated with a capital stock of $1,000. The company is to build a line between Wolcott and South Butler. The directors of the company are Cyrus Aikens, of Savannah; J. B. Aikens, Lucius H. Viele, L. I. Douglass, Delos S. Chapin, J. W. Miller, A. J. Ackerman, all of Butler.

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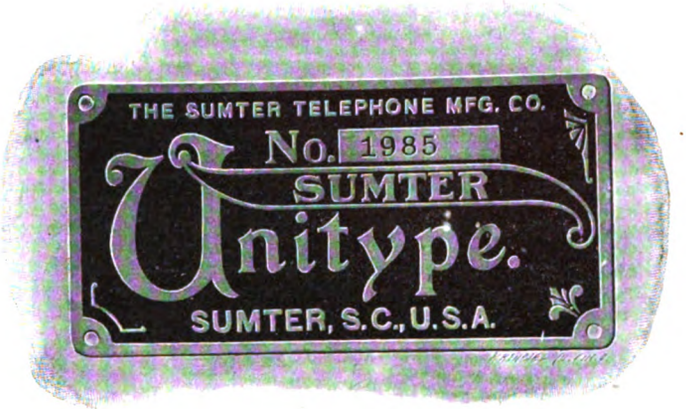

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THE WEEK'S MESSAGES

ENDERLIN, N. D.—The Moore & Liberty Telephone Company, of Enderlin, N. D., has been incorporated with a capital stock of $50,000. The incorporators are John Atsneim, Ole Christianson, E. O. Fauseth, John Kaber, Espen Groth, Harry A. Pherigo, Enderlin; Geo. Olson, Sheldon.

SENTINEL BUTTE, N. D.—The Billings County Local and Long Distance Telephone Company, Sentinel Butte, N. D., has been incorporated with a capital stock of $10,000. The incorporators are R. L. Barnett, Harve Robinson, J. B. Stoddard, Lewis F. Crawford, W. G. Lang, Sentinel Butte.

HOOKER, OKLA.—The Gotobed, Son and Company Telephone Company has been organized at Hooker, Okla. Wm. Gotobed is vice president of the company. Lines will be built to the town of Beaver and to neighboring counties.

HEASTON, OKLA.—The Heaston and El Reno Telephone Company has been organized with a capital stock of $5,000. Charles Bradley and others are the incorporators.

NOBLE, OKLA.—The Farmers' Telephone Company, of Noble, Okla., has been incorporated with a capital stock of $1,000. The officers are as follows: A. L. Lewis, president; A. Flitner, vice-president; A. J. Burkett, secretary and treasurer.

MOUNT ORAB, O.—The Mt. Orab Telephone Company, Mt. Orab, has been incorporated with a capital stock of $10,000. The incorporators are A. R. Watson, George E. Kratzer, P. A. Wickersham, L. H. Leanard and McCray Vance.

LOCK HAVEN, PA.—The Sugar Valley Telephone Company has been organized. The incorporators of the company are Harry Welshans, Byron Eckel, Dr. Goodman, William Morris and others. The company's lines will extend from Tylersville to Logan Mills, Greenburr, Booneville, Loganton, Rosecrans, Rote, Mill Hall, Reversburg and Millheim. The company's lines will connect with those of the Commercial Company and the Bald Eagle Telephone Company.

NEW BEDFORD, PA.—The New Bedford Telephone Company, recently organized, is to install a telephone system throughout the town of New Bedford.

ROARING CREEK, PA.—The Roaring Creek Valley Telephone Company has been incorporated with a capital stock of $5,000. The following officers have been elected: President, A. W. Whitner, Roaring Creek; vice-prseident, R. H. Charington; secretary, John Rhoads, Numidia; treasurer, W. B. Hower, Roaring Creek.

ALPENA, S. D.—The Alpena Farmers' Telephone Company, Alpena, has been incorporated with a capital stock of $4,500. The incorporators are J. E. Shull, Michael Wahl and H. Erickson, of Alpena.

GUSTINE, TEXAS.—The Gustine Independent Telephone Company has been organized.

PANGUITCH, UTAH.—The Garfield County Telephone Company, Panguitch, has been incorporated with a capital stock of $20,000. The following are the officers and directors: M. M. Steele, president; Thomas Levy, vice president; R. S. Clark, secretary; J. D. Spencer, treasurer; James Showalter, S. O. Henrie and R. G. Clark, directors.

LEVEL RUN, VA.—Renan Telephone Company, Level Run, Va., has been incorporated with a capital stock of $5,000. The officers are W. C. Harvey, president, Renan, Va.; E. A. Smith, secretary and treasurer, Hurt, Va.

BROWNTOWN, WIS.—The Browntown Telephone Company, Browntown, has been incorporated with a capital stock of $5,000. The incorporators are O. M. Erickson, E. Harse, H. H. Bissell and Iver Ellingson.

LIBERTY, WIS.—The Liberty-Newton Telephone Company has been organized with a capital stock of $1,400. It will establish a telephone system at Liberty, Manitowoc County.

MILWAUKEE, WIS.—The Milwaukee Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are B. C. Roloff, C. L. Gross and S. Stover.

WEBSTER, WIS.—The Webster-Orange Telephone Company is being organized at Webster. The line is to start at Webster and run northeast by way of Orange and Ham Lake.

WEST SALEM, WIS.—The West Salem Telephone Company has been organized, and will build a line to Esdaile.

MEDICINE BOW, WYO.—The Medicine Bow Telephone Company has been incorporated with a capital stock of $10,000. Those interested in the new company are Ed. Walters, R. N. Cronberg, O. P. Reed, John Burnett and Charles Cooper.

LOW BANK, ONT., CAN.—The Low Bank Telephone Company has been incorporated with a capital stock of $40,000. The company will carry on a telephone business in Haldimand County. The directors are A. Barrick, J. E. Furry, A. Mann, all of Haldimand County, Ontario.

TORONTO, ONT., CAN.—The Denorwic and Gold Mines Telephone of the Bourbon Home Telephone Company at Paris, Ky.

CLARENCE L. HUMBERT has been appointed superintendent of the Central Home Telephone Company. He will have headquarters at Paris, Ky.

PERSONAL.

W. F. ACHENBACH has resigned his position with the New York and New Jersey Telephone Company to accept the position of traffic superintendent of the State of Virginia for the Southern Bell Telephone and Telegraph Company, with headquarters at Richmond.

M. G. HOSEA, of Columbus, Ind., has accepted the position of manager of the Bourbon Home Telephone Company at Paris, Ky.

CLARENCE L. HUMBERT has been appointed superintendent of the Central Home Telephone Company. He will have headquarters at Paris, Ky.

MISCELLANEOUS.

BARDSTOWN, KY.—Agitation against the Cumberland Telephone and Telegraph Company is in progress, owing to an arbitrary increase in rates. Much important business is handled here, as the town is the centre of the largest distillery district. Citizens are hoping for the establishment of an Independent company, which in connection with an extension of the lines of the Independent Long Distance Company, would give service to Louisville, 39 miles distant, and other places.

NORTH BRATTLEFORD, SASKATCHEWAN, CANADA.—The citizens of North Brattleford are desirous that some company shall start an independent system in North Brattleford. J. A. Gregory & Company guarantee one hundred telephones.

New Construction in the Field

BLUE MOUND, ILL.—The Blue Mound Telephone Company is rebuilding its entire system.

CHANDLERVILLE, ILL.—The Cass County Telephone Company is to construct a line extending northeast from Chandlerville.

DIXON, ILL.—The Home Telephone Company is to build a line to Palmyra, also a line to Grand Detour.

E. MOLINE, ILL.—The Central Union Telephone Company is to lay a cable from East Moline to Silvis.

ELKHART, IND.—The Elkhart Independent Telephone Company is installing its plant and will also build lines to surrounding towns.

GIBSON CITY, ILL.—The Gibson City Telephone Company, which has just completed a line to Mt. Airy, is to build another line west to the county line.

MOLINE, ILL.—The Union Electric Company, of which H. W. Miller is general auditor, is to build a number of toll lines throughout Iowa and Illinois to compete with the Bell Company.

SPRING GROVE, ILL.—The Spring Grove Telephone Company, which is extending its lines to Ringwood, contemplate building a line to McHenry.

CHURUBUSCO, IND.—The Geiger Telephone Company, of Churubusco, is to install an exchange at Laotto.

LEMARS, IA.—The LeMars Telephone Company is building new lines in the vicinity of O'Leary.

PEWEE VALLEY, KY.—The Louisville Home Telephone Company has completed the construction of a new plant which will enable it to give the highest grade of service.

RUSSELLVILLE, KY.—The new Independent long distance lines south of Bowling Green, Ky., are complete as far as this place. The construction of an up-to-date Independent exchange will be rapidly pushed.

MT. VERNON, ME.—The Mt. Vernon Telephone Company is to construct lines into several neighboring towns.

MANSFIELD, MASS.—The Norfolk and Bristol Street Railway Company is to string 26 miles of telephone wire along its line, and every car is to be supplied with a telephone.

BENZONIA, MICH.—The Benzie County Telephone Company contemplates building a line from Benzonia to Manistee.

STANDISH, MICH.—The North Eastern Telephone Company is improving its system in Standish.

EVELETH, MINN.—The Mesaba Telephone Company is to build a new exchange at Eveleth to meet the demands of increased business. The company contemplates spending $100,000 in the improvement of its system.

PORTALES, NEW MEXICO.—The Roosevelt County Telephone Company is building a line from Portales to Brownhorn.

SOUTHWEST CITY, MO.—The Independent Telephone Line, owned by Messrs. Potter and Bostwick, with exchanges at Southwest City, Sulphur Springs and Beaty, is to build a line on the border of Missouri, extending from near Cayuga, I. T., to either Lanagan or Noel, Mo.

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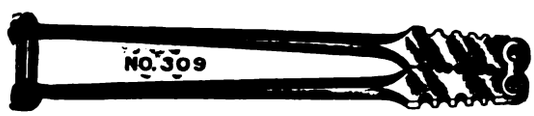

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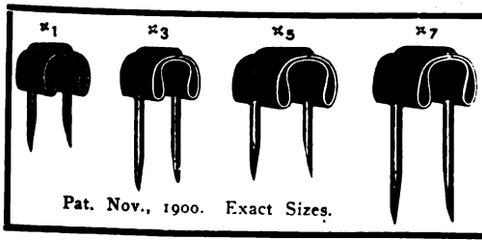

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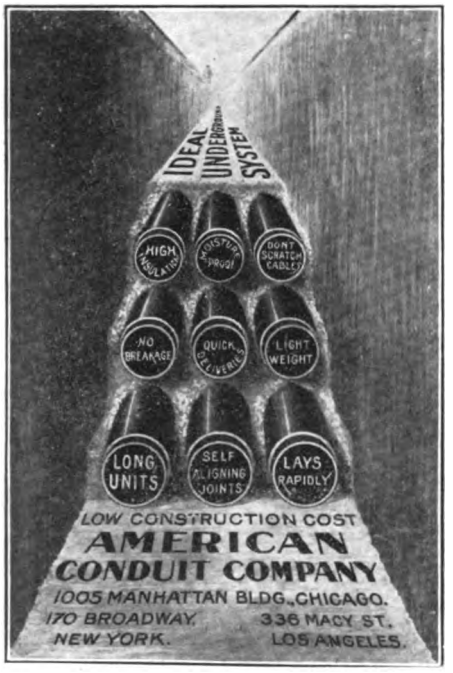

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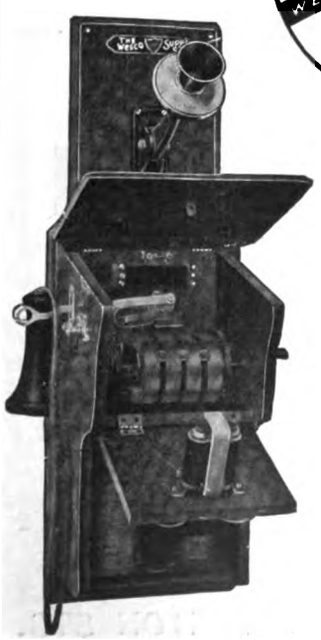

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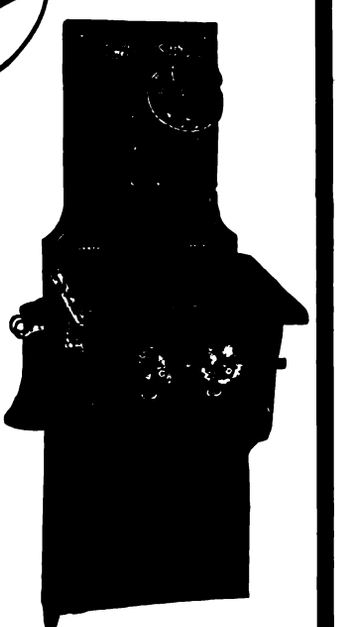

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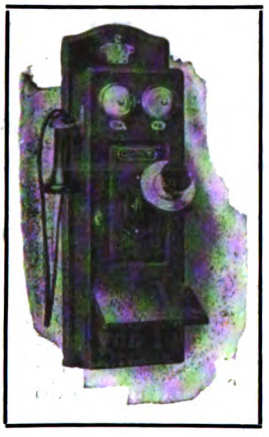
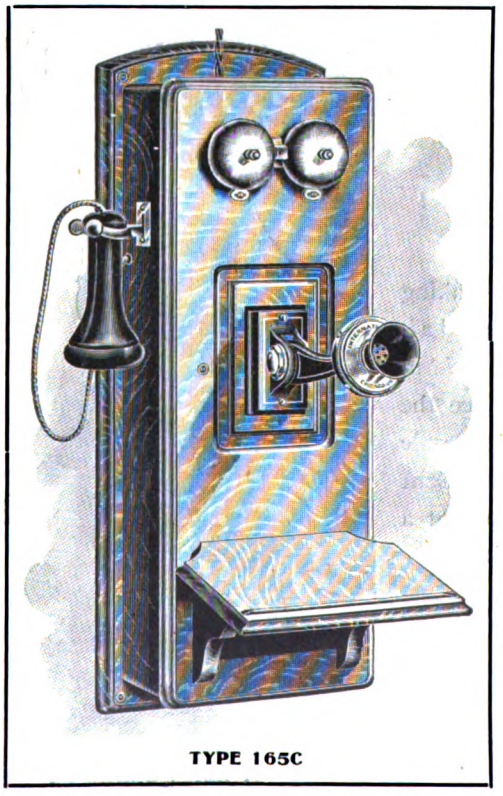
Human Nature is Pretty Peculiar

Everyone of us has a different brand, but on the whole we all agree that the best is none too good. It's the same way with telephones. There are more brands and types than you can shake a stick at, still we are always trying to make a better. We've got one now, our "New Beauty," that will hold us for a while, and we stand pat on the statement that it has no equal. Just send for a sample if you wish to see. Look it over carefully, test it any way you like. Compare it with any others you may have, and then do some hard thinking to find out if there is any point that could be improved. We don't think you can, still we'll be pleased to have your criticism and your order for as many as you may need. We've got them right here in stock, boxed up, all ready to ship so there'll be no delay.



THE EWING-MERKLE ELECTRIC CO., St. Louis, Mo.



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If you want a telephone that you can put out on your rural party line and give absolutely the best service and one that will save you many a long expensive drive out into the country, get the

International

All connecting wires, binding posts and terminal screws fully concealed, preventing these parts accidentally becoming disconnected.

No exposed metal parts in the circuit, avoiding danger from lightning while using the instrument.

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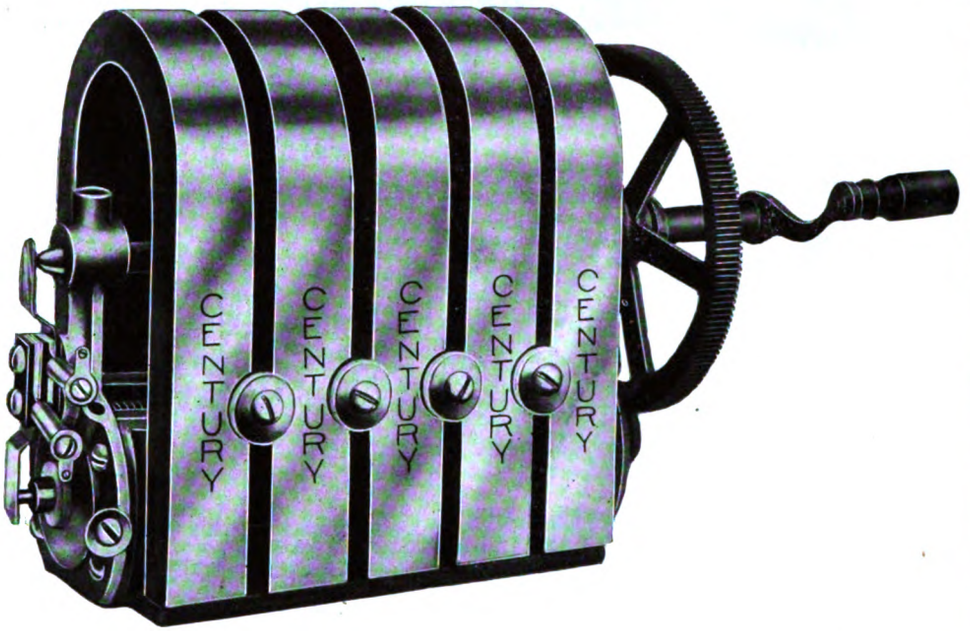
The reason why you can connect more

Century Telephones

on a line, and still have more than sufficient ringing power, is because the "CENTURY TUNGSTEN" steel generators are equipped with magnets made of tungsten steel. This steel will retain about 30 per cent. more magnetism than any other, and consequently when used in generators increases their power just that much. The generator has other features just as good that we will be pleased to show you. LET US SEND YOU ONE. Our line of Magneto and Common Battery equipment is complete.



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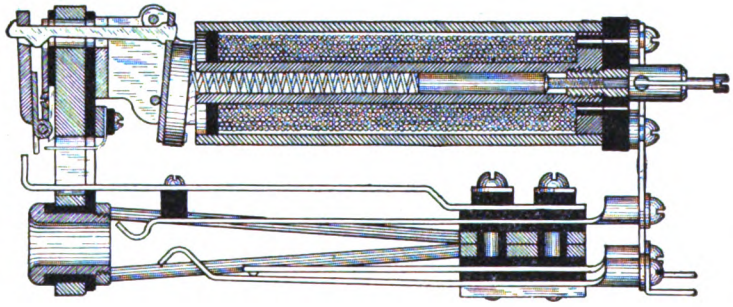
MONARCH

THE varying conditions of bridging lines make it necessary to have an adjustment on bridging drops if it is desired that a distinct signal be given the operator. On a short light line a drop receives a large amount of current and without some adjustment feature the armature will pull up and stick without giving a distinct buzz. The operator is then unable to determine whether the call is for central or for another subscriber on the same line unless she plugs in. In all Monarch bridging drops a spring adjustment is provided which makes it possible to bring a slight or great tension to bear against the armature. By referring to the illustration it will be seen that the core of the drop coil is bored out and that a light coil spring is placed within. At the front end this spring presses against the armature, while at the rear end a plunger is engaged. A set screw passing through a split metal bushing in the head of the coil comes into contact with this plunger. On short light lines this screw is tightened so that the spring presses against the armature and causes it to respond quickly to the ringing impulses. On long heavily loaded lines the screw is loosened so that little or no pressure is brought to bear. By this means every drop can be adjusted for its particular line. ¶ Many other valuable features are illustrated and described in the switchboard catalogue. A copy will be sent upon request.



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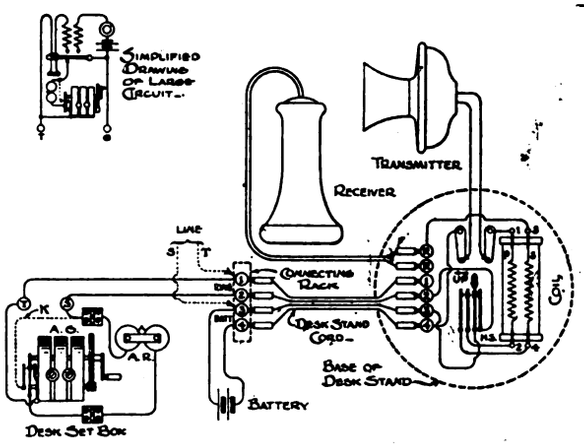
DEAN TELEPHONE APPARATUS

OUR DESK SET CIRCUITS



STANDARD DEAN BRIDGING PORTABLE DESK TELEPHONE CIRCUIT.

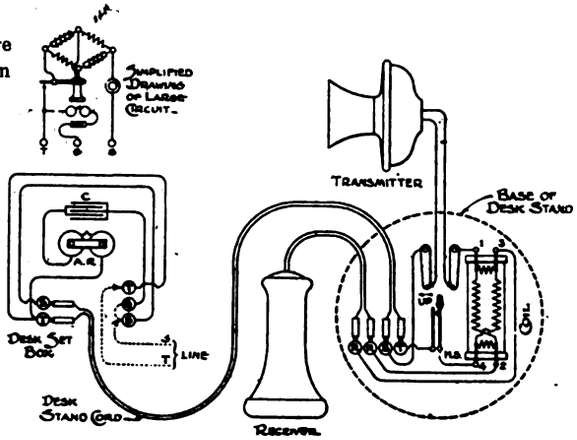
Series circuit is the same, but does not include wire "K" in the desk set box. The ringer and generator can be furnished in any size.

latter being through set screws in the binding posts. These binding posts are made heavy and are provided with lock nuts for securely clamping the line in the common battery set, the desk set box and battery as well as the line in the bridging sets.

For full description write, call or telephone for folder No. 3A.

The external design and the parts showing the simplicity of removing all parts for inspection was shown in last week's JOURNAL.

This week we wish to call your attention to the circuits which are shown in the accompanying illustrations. All the talking apparatus, which is standard Dean product, is located in the stand itself. Regular cord tips at each end connects the stand circuits to a terminal block; the fastening to the



CIRCUIT OF THE DEAN COMMON BATTERY PORTABLE DESK TELEPHONE.

BRANCH SALES OFFICES

No. 511 Kansas City Life Building
Kansas City, Mo.

No. 542 Byrne Building
Los Angeles, Calif.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY— —THE BEST IS THE CHEAPEST

KELLOGG
FREQUENCY POLE CHANGER

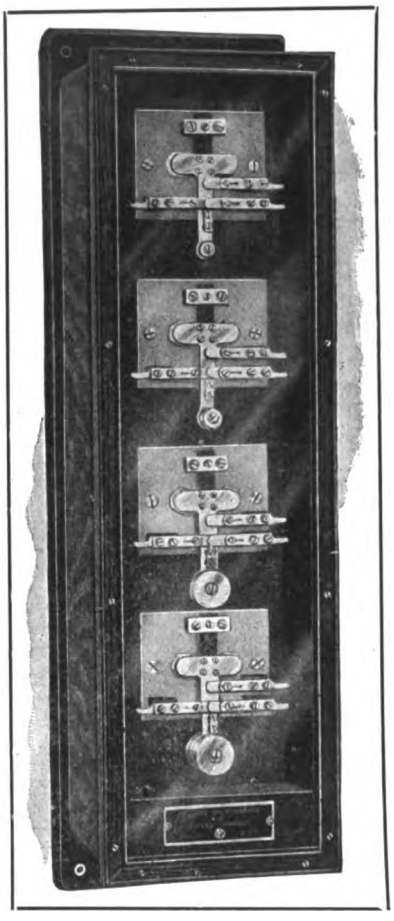
Utmost SIMPLICITY of Operation

THE EFFICIENCY

and beauty of the Selective Harmonic Ringing System of the Kellogg Company has been fully recognized by the entire Independent field, but the difficulty, heretofore, has been that the system required a generating device which involved a rather high first cost, and a relatively large consumption of energy.

The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



"FRONT VIEW"—COVER ON

ADVANTAGES

1. Requires very little attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
5. Operates successfully on any standard voltage of a telephone exchange.
6. Practically noiseless in operation.
7. Only THREE contacts on each vibrator.
8. The vibrators have a very long spring, hence they will not break or change the frequency.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

Send for Folder No. 3 **Correspondence Solicited**

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES:

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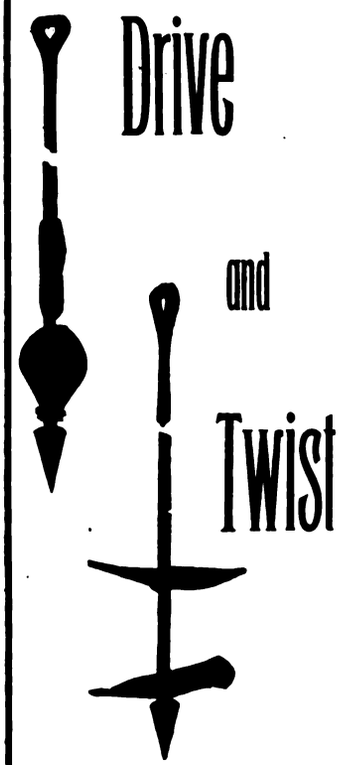

Have You Seen Our New Anchor

equipped with two sets of blades at right angles to each other. This anchor is immovable by any direct strain when once set.

It is installed by Driving and Twisting, the same as the earlier type.

This anchor is especially fitted for hard and stony ground and can be set in one-tenth the time required for any other type.

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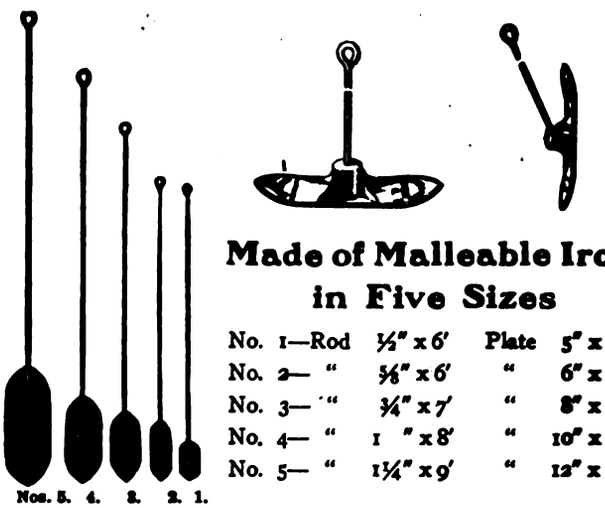

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No. 1—Rod	½" x 6'	Plate	5" x 10"
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No. 3— "	¾" x 7'	"	8" x 18"
No. 4— "	1 " x 8'	"	10" x 22"
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We will ship and prepay freight on first order of twelve anchors. If not satisfactory, return at our expense

The W. G. Nagel Electric Co.

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Cash Register and Pay Station

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

No Disputes,

No Trouble.

It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE United States Coin Register Co.

TOLEDO, OHIO

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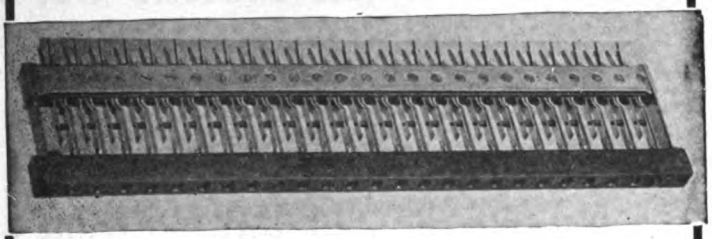
COMMON BATTERY

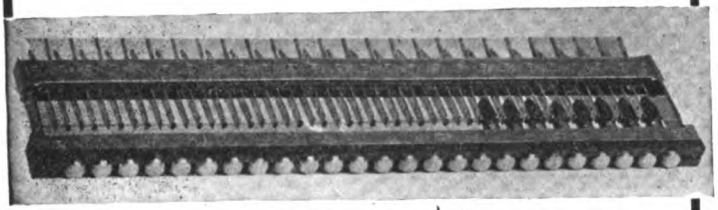
1500 LINE BOARD

SWITCHBOARDS



MULTIPLE JACK STRIP 25 JACKS

3 WAY MULTIPLE PLUG



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SECURITY POLE SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.

Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton. You will be pleased on investigation.

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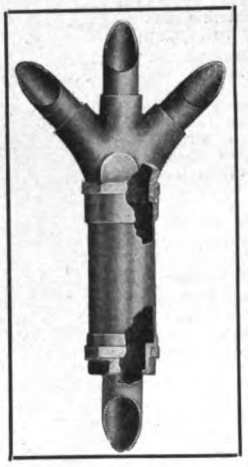

Made of selected brass. No expert plumber needed to fit head or sleeve. Always ready for inspection or removal. Waterproof after inspection same as before. Samples sent on trial. Complete information and blanks for ordering, upon request.

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Operator's Revolving Chair

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Steel Foot Rest—Seat and Back Readily Adjustable to Occupant—Height of Chair Easily Regulated. Frame work made of Bessemer Steel, ⅜ (three-eighths) inch Rods twisted and interwoven. Wood work, oak, birch or mahogany finish, as preferred. Metal work heavily plated, Japanese copper finish.

The Most Comfortable High Chair Made

The Most Attractive and Convenient

INDESTRUCTIBLE—Nothing to get Broken

24 in. high 28 in. high

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with that TELEPHONE INVESTMENT of yours?

Why doesn't it pay you as well as the best of your investments?

Is the reason bad management or bad equipment? More likely the latter.

Probably the company is trying to do a 20th Century business with 19th Century apparatus.

If that's the case, it is spending more and earning less than it might if it had our Automatic Telephone equipment.

This is the only really modern telephone system. It produces the ideal telephone service—quick, sure and secret—at half the operating expense of a manual equipment, and this service commands better rates.

It costs a fixed price per hundred lines to enlarge the automatic exchange, instead of an increased price per each hundred lines, as in the manual equipment.

The automatic exchange is never outgrown; it never has to be "scrapped" and replaced by a complete new one, as with the manual. You just add to it as you do to a sectional book-case.

All these points bear upon the stability and value of your telephone securities. They mean dividends to you.

Over ninety per cent. of all the large orders placed during the past few years, either for new installations or replacements, have been for our automatic system, and all the companies adopting it have, from the increased earnings, been able to pay the interest on their bonds and a good dividend on their stock.

Our Automatic System has been adopted in the following cities:

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Auburn, Maine.
Auburn, N. Y.
Battle Creek, Mich.
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Berlin, Germany.
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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets, CHICAGO, U. S. A.

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Central Energy Telephones

Stromberg-Carlson

TELEPHONE MANUFACTURING CO.
ROCHESTER, NEW YORK

IF you use or contemplate using Central Energy Telephones it will pay you to get a copy of this new bulletin. There is sufficient evidence in it to prove that the telephones illustrated therein are without exception the most modern and nearest to perfection of any ever placed on the market. This statement is not based on the fact that our cabinets are better finished, that we have a better transmitter or a removable hookswitch, but the telephone taken as a whole.

There is not room enough on this whole page to explain all of their good points. By good points we mean the things that make your subscribers satisfied, eliminate troubles caused by accidents or carelessness on the part of users.

It will only cost you a two-cent stamp and a moment's time to get a copy. Just ask for Bulletin No. 15-B.

Shall we send one?

Stromberg-Carlson Telephone Mfg. Co.

General Offices
Rochester, N. Y.

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WE MAKE CABLE

To Be Forewarned Is to Be Forearmed

If you read the telephone papers you will frequently see items that read something like this:

> "The X. Y. Z. Telephone Company is spending $..... in the reconstruction of its system. Cable is to be substituted for the open wire lines, * * * * * When the company started in business, it was thought that the capacity of the plant then installed would be ample for all time to come, but it was not long before extensions had to be made. When the improvements are completed the system will be doubled in size."

To those who read between the lines these statements plainly indicate which way the wind blows. "The telephone business is growing fast, very fast." Perhaps this wave of expansion has not reached you, but it will; therefore be prepared. Do only that construction which will enable you to handle an increased volume of business with the least outlay. For the line plant use cable. It is flexible, low in maintenance cost and best for service. Open wire has none of these desirable qualities. You should use the best cable, the cable that you can rely upon, the cable that is the Standard of the World—

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Onr booklet 79B tells you how it is made, our sales department will give you prices and our engineers will enlighten you upon its technical advantages. It's free—ask for it.

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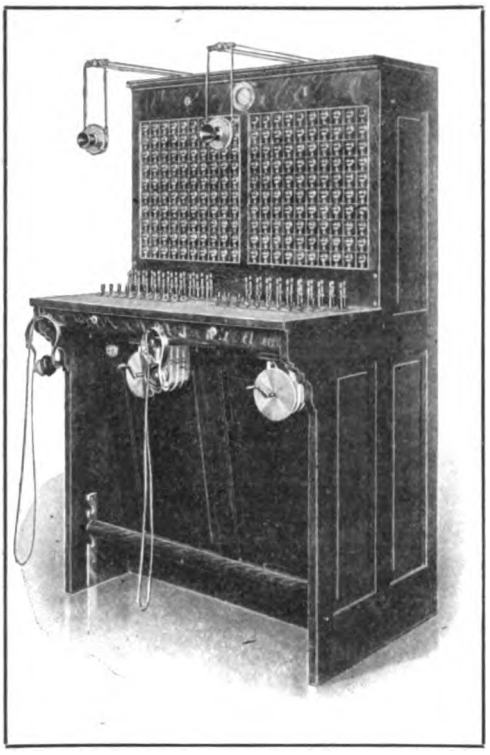

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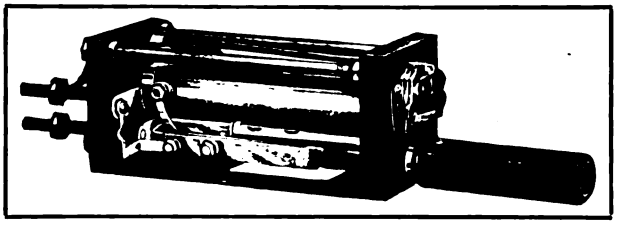
Ask for Souvenir B.

SWITCH-BOARDS
of Any Desired Capacity

All of our switchboards are wired to their full capacity. Cabinets are furnished in any capacity with any desired number of drops installed. All drops, cords, plugs and cable wiring made for full metallic circuits. All boards wired with sufficient cable to reach distributing board.



No. 68—Self-restoring switchboard drop.

One or more pair of cords connected to repeating coils, thus making it possible to connect metallic circuit and grounded lines to same board. This equipment is A1 in every particular. If you are interested we will gladly send you complete specifications and prices.

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If Your Supply House Don't Handle Them—Order Direct

Frankel's Electric Testing Clips

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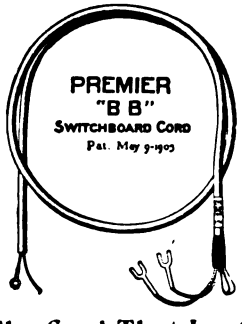

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VOLUME XIII *SATURDAY, MAY 26, 1906* *NUMBER 21*

The Plant at Decatur

By James G. Bates.

THE Independent telephone system at Decatur, Ill., has made a record for growth in the face of the most formidable opposition which is little short of marvelous. This exchange was one of the forerunners of the great movement of Independent telephony, and started its business nearly two years prior to the expiration of the fundamental patent on the telephone. Early in 1892 there was organized a small co-operative company, under the name of the Citizens' Mutual Telephone Company, for the purpose of installing a telephone system connecting the places of business of its members. The project was not entered into at the time with any thought of permanency, but with the hope of forcing the monopoly to give better service at just rates.

After having secured the pledges of several hundred subscribers, the company began the building of an exchange, putting in the ordinary grounded return circuit line construction, and equipment of the old Harrison - International type. As soon as the Citizens' Company had put its exchange in operation, the Bell Company commenced a rate war, reducing its rates below the charges of the new company. This method of competition, however, did not tend to check the growth of the Citizens' company. Its hold upon the patronage of the people was based on their confidence in the necessity for its existence to keep the rates at a just level and it continued to add new subscribers. As soon as the Bell Company realized that it could not regain its monopoly by competition, even under the reduced rates, it attempted to annihilate its rival by patent litigation. Notices were sent to subscribers as well as the stockholders, threatening to collect heavy damages or royalties from the users who enjoyed the benefits of the Independent service.

The Manholes at Decatur Are Dry and Comfortable.

The officers of the Citizens' Company, however, were determined to succeed or fight to the bitter end. They assured their subscribers that they would be protected. Inasmuch as the offence, if any, had already been committed and a continuance could do no greater harm or damage, the subscribers agreed to support the local company in every way possible. The patent suits were based on the use of certain switchboard devices which were claimed to be infringements on Bell apparatus. The local company was obliged to defend the case at its own expense and put up the best defense possible, continuing the litigation for over two years before it came up for decision. Before the case was adjudicated, however, the Citizens' company had discontinued the use of the Harrison board and had installed a Utica equipment. The case was finally decided in favor of the Bell Company with reference to the patent infringement, but inasmuch as the Bell Company could not show that the company at Decatur was at that time using the equipment referred to, nor prove how long the equipment had been used by it, nor in fact that the company had ever had this type of board in service, the case against the Mutual Company was dropped. After this defeat, even more determined to stop the operating of the exchange, the Bell company immediately filed another infringement suit on the Utica equipment. This case was also defended by the local company and the litigation continued practically two years before the case was decided. The Mutual Company, profiting to some degree from its first experience had, in the meantime, again displaced its switchboard equipment and adopted another make of apparatus, so that when the second infringement case was decided in favor of the Bell company it did not affect the operating company, inasmuch as there was no satisfactory proof that the patents infringed had been in use in the Decatur exchange.

After this second defeat at the hands of the Citizens' company the Bell people evidently decided that it was impossible to exterminate their rivals by patent litigation, for they resorted to another method for stifling competition, that of buying up the plant of their competitor. About a month prior to the annual stockholders' meeting of the Citizens' company, at the close of 1896, a so-called capitalist giving his residence as Saginaw, Mich., began to invest in the securities of the Decatur company, and through some local attorneys bought up considerable of the stock

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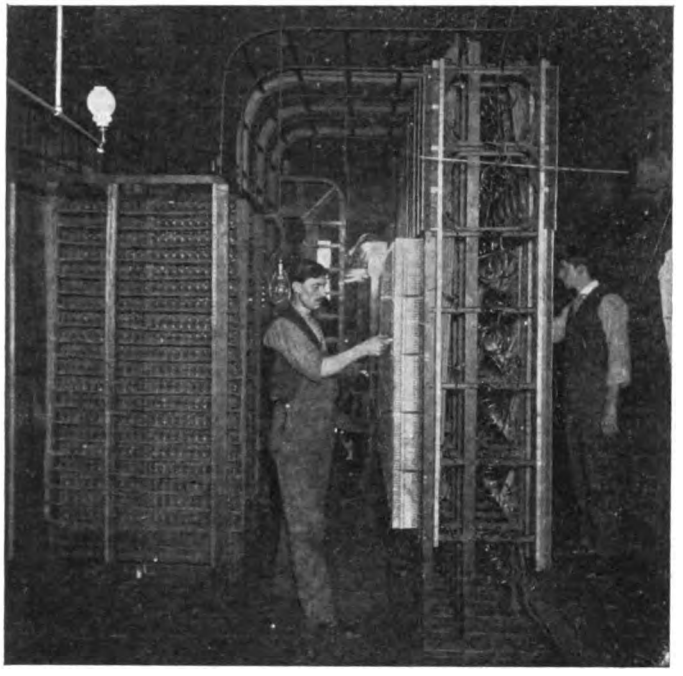
and secured options on enough to give him control of the stockholders' meeting. At the annual meeting according to the company's by-laws, the stockholders were to elect three directors to a board of five, the two other members having been elected the year previous for a term of two years. It is presumed that the



View of terminal room, showing relays and distributing frame.

capitalist from Saginaw intended to elect the three directors, or a majority on the board, as he had a controlling interest in the company.

Before the stockholders proceeded with the election, however, Mr. C. S. Hankins, now president of the company, then a minority stockholder, requested the chairman to have the secretary read the Illinois State Statutes relating to the right of the minority stockholders to cumulate their vote for the election of directors, saying that he understood that one-fifth of the stockholders could cumulate their vote and elect one director to a board of five. Before the secretary had finished the reading of the section referred to, the new stockholder from Saginaw, with his local attorney, disappeared from the meeting. This left the local stockholders in full command of the meeting, and, in the absence of a quorum, they adjourned until the following evening. It had been learned that the options had been taken to fall due on the date of the annual stockholders' meeting, at the close of which day they had expired.

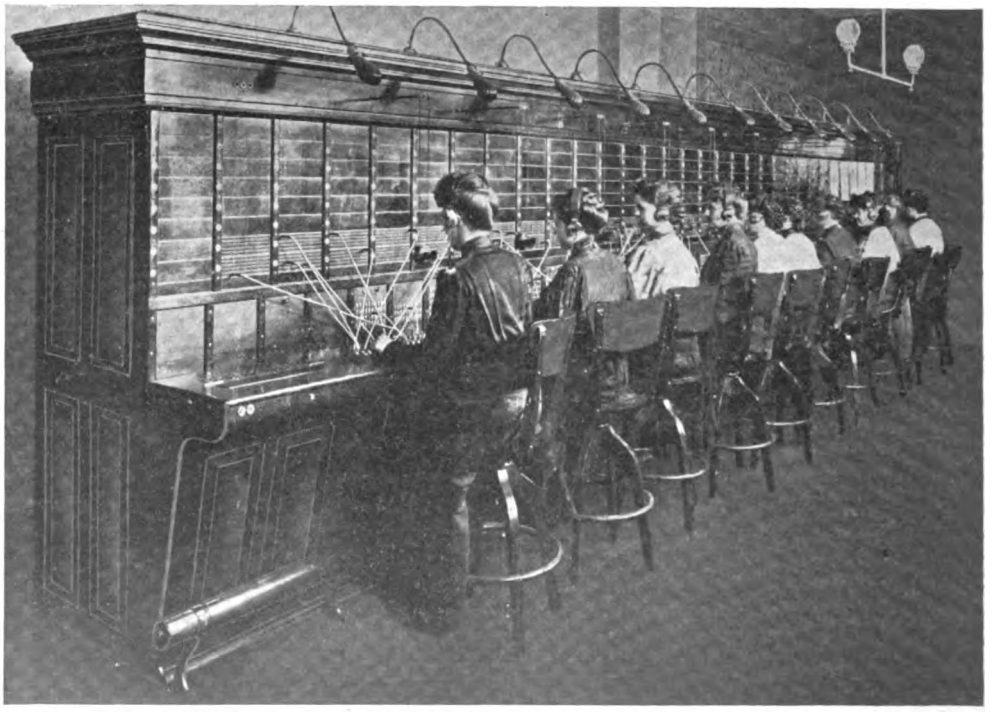
This action on the part of the new stockholder showed the local business men that some definite stand and decisive action must be taken at once, or they must abandon the hope of enjoying the benefits of the Independent telephone service. Before the time of the adjourned meeting there had been transferred to a trustee, to be voted by a committee selected at the meeting, enough stock to give the local people absolute control of the company.

After this the company was a third time made defendant in a patent suit. The manufacturer of the equipment which it was using at this time did not properly defend the case, leaving the burden again upon the local company. This case, like the others, continued in the courts for about two years. In 1898, shortly before the case was adjudicated, the Citizens' Mutual Telephone Company discontinued business, and its property was bought by a local syndicate who organized the Macon County Telephone Company to continue the Independent service. This new company discarded the switchboard apparatus used by the old company, and purchased an equipment of another make.

In face of all these expenses and discouragements the company continued increasing the size of its exchange, and about a year ago had in operation a thousand local lines, which was the ultimate capacity of the switchboard it then had in operation. The demand for service was still constantly increasing, and it became necessary to enlarge the system. It was apparent that it would require a multiple switchboard system to properly take care of the service. At this point a question arose, which is a matter of considerable importance to many of the Independent telephone exchange managers at this time—that is, whether to increase the plant by installing additional trunking sections and equipping the system with additional transfer apparatus, or to install a magneto multiple equipment to operate in connection with the old telephones and grounded construction, or whether to install or provide for a future full central energy system. To install a complete central energy system by changing the central office apparatus, replacing the telephones and rebuilding their outside construction to metallic lines, would have incurred an expense requiring practically a reorganization of the company.

After consideration of the circumstances and probable future requirements by C. S. Hankins, the president of the company, and W. B. Burke, the company's manager for the past seven years, it was decided to adopt a special lamp signal magneto multiple equipment, and at once start rebuilding the plant with a view to ultimately changing to full central energy, but making the changes at intervals out of the profits of the business.

The system selected was designed especially for re-equipping exchanges where companies are required to re-equip their central office to provide for the constantly increasing demands, and where they are not in position to rebuild for complete central energy at one time. The system is so constructed that it may



Switchboard of the Macon County Mutual Telephone Company, at Decatur, Ill.

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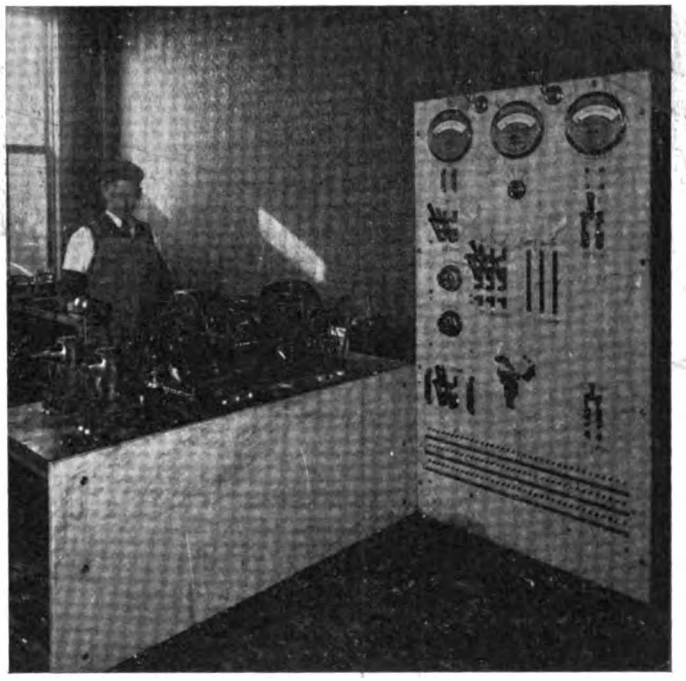
be used in connection with common return or grounded line construction, and with the old style individual generator-call local battery instruments, and at any time changed to a full central energy equipment without discarding any of the central office equipment of their make installed. This enables the operating company to change to central energy at any time when the lines are built metallic and when the company is in condition to replace its telephones.

The switchboard which was installed consists of four sections of three operators' positions each. The exchange line equipments are so distributed that there are 120 and 130, respectively, in each alternate position, and there are 50 self-restoring drop signals for farmers' line work in the first annex position.

The board is built with a multiple jack capacity for 4,800 lines. The frame is constructed in sections, arranged for three operators' positions each. Each section is sub-divided with eight panels for the multiple jack space, and with nine panels for the line equipment space, arranged three panels to each position.



Charging and ringing machines and power switchboard in the Decatur exchange.

The framework is self-supporting, and is built of architectural iron, so braced and bolted together as to make it strong and rigid and properly support the necessary equipment, cabling, etc., and withstand the extra strain to which it will be subjected when making future additions or alterations.

The cabinet work is of well-seasoned, quarter-sawed golden oak finished panels. The space in the face of the board unoccupied by the necessary apparatus is filled in with panels to match the cabinet. The plug-board and the panel back of the plugs is covered with heavy sole leather. The key-boards are five-ply with the grain of the two outside and central layers running lengthwise, and the grain of the other two layers running crosswise. The key shelves are in sections of one position each, and are hinged so they may be raised, leaving the keys open for convenient inspection. The shelves are provided with a Yale lock, to prevent operators opening and using the key trough for purposes other than that for which it is intended.

The plug-board is drilled for two supervisory clearing-out signals for each pair of cords. In the present equipment, for magneto-call service, only one clearing-out signal is installed, but all provision is made so that when the system is changed to central energy, the necessary apparatus may be installed for double supervision. On the key shelves are mounted the vertical type combination listening and two-party selective ringing keys.

The first position contains the necessary multiple jacks for serving as an annex to the second position containing the first exchange lines. The annex position is also equipped with 50 high wound, bridging, non-inductive tubular self-restoring drops and corresponding answering jacks for magneto-call rural party lines. The springs in the jacks of the drop line equipments are built of No. 18 B. & S. gauge spring German silver sheet, and have a bending length of two inches. The springs, near the tip end, normally rest with a strong tension against an insulated stop post, to give a positive plug connection at all times. This construction of the jacks enables using a small plug, such as is necessary for large multiple boards, and avoids all liability of poor and loose contacts when the plug is inserted.

The plugs are of such size as to enable inserting two or more in adjoining multiple jacks, which are built on ⅜-inch centers. The plug is provided with a loose sleeve to prevent kinking the connecting cord if the operator turns the plug. The sleeve is held in position to a set ring fastened by a small steel screw.

With this system the regular two-conductor connecting plugs and cords are used. The drop-restoring device is mounted in the path of the plug and supported on a German silver compensating spring, which insures a positive restoring of the drop at all times, even after the parts have become worn from long continued usage. The exchange line equipments consist of the regular two-spring jack with associate lamp jack and lamp, with line and cut-off relays.

The equipment and wiring is so designed and arranged that the line signals respond to a very slight turn of the subscriber's telephone generator in the old instruments now in use, and so that when the instruments are replaced with central energy telephones, the same equipment throughout can be used by simply changing the connection on the relays already provided, and operate as a regular central energy equipment. Although the telephones now in use are varied, there being some of almost every style on the market and many of early make which have weak generators, the relays on the new switchboard equipment are said to respond to every call and make the lamp line signal positive and reliable. The relays are of the tubular type, having the coil mounted in a soft annealed iron tube, so that when the armature is drawn up the coil is completely surrounded by iron. The iron of the armature is all supported on the outside of its pivot, so the energy is all exerted direct with no lost force, making an extremely sensitive and positive relay. The coil being completely enclosed on all sides when the armature is drawn up absolutely prevents all possibility of cross-talk or induction.

The German silver contact springs of the line relays are more than two and one-half inches in length, from the contact to the support, giving ample space for a wide and reliable break in the contacts. The springs rest on an insulated stop at the contact end to enable giving them the proper tension, insuring positive contacts. The springs are firmly clamped between mica insulation by heavy binding screws threaded into metal, not depending on threaded rubber or fibre. The relays are firmly clamped to a heavy iron mounting strip, provided with a substantial brass base, with the outer edge threaded, upon which is screwed a brass tube cap completely enclosing the relays individually, making them dust-proof.

Each position of the board is provided with an operator's set, including a line pilot, clearing-out pilot and the necessary order wire circuit to the toll board. Multiple jacks, wired in parallel with the answering jacks, are mounted in each six panels of the eight panel sections, enabling each operator to make connection with any subscriber's line without reaching beyond the three-quarter section in which the call is received, making the reach only two-thirds of the adjoining positions.

The multiple jacks are built on ⅜-inch centers. The springs are constructed of No. 18 B. & S. gauge German silver sheet, and are two inches in length from their support. At the plug end

(*Continued on page 347.*)

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The Indianapolis Convention

THE Indiana Independent Telephone Association has just closed one of the most important, enthusiastic and interesting two days' conventions ever held by telephone men in the State. On account of the great progress made in this State and the publicity given the Independent movement during the past few months, the convention was attended by over 300 prominent telephone men—members of one of the strongest State associations in this country. The plan of the association is not only unique, but exceptionally strong in its working and co-operative district branches.

The convention was held in the assembly room of the Claypool Hotel, which was beautifully decorated for the occasion. Conspicuous among the decorations was a large and artistic banner bearing the following inscription:

In Indiana there are:

400 Independent Telephone Companies.
15,000 Stockholders.
200,000 Subscribers.
$20,000,000 Capital invested.

In the absence of George W. Beers, of Ft. Wayne, president of the association, Vice-President Theodore Thorward, of South Bend, presided over the first session. Mr. Thorward said that the meeting was the first annual gathering of the association and was of such importance as to make time precious. For this reason he proceeded at once to the business of the convention. The minutes of the initial Winona meeting held nearly a year ago were read by the secretary Charles S. Norton, of Indianapolis. The minutes contained a brief history of the plan of the organization; the division of the State into eleven districts, each district branch presided over by a vice-president. The secretary's report also gave a synopsis of the meetings held by the district branches and the work accomplished during the first year. The full and gratifying report of the secretary put the convention in an enthusiastic attitude which lasted throughout the succeeding sessions.

The executive committee of which Mr. Jesse W. Weik, of Greencastle, is chairman, made its report, which rivaled that of the secretary for completeness and interest relative to the vast amount of work accomplished during the first year of this excellent association.

In the absence of President Beers, his annual address was read by Mr. A. C. Lindemuth, of Richmond.

Mr. Beers congratulated the association upon the wonderful progress, growth and success during the past year, and said that "Independent companies are growing stronger every day and in direct competition are proving their superiority to the Bell. Rural telephones and small town exchanges were not known until they were established by the Independents and now they serve nearly every hamlet and a majority of the farm houses in this State. Their long-distance requirements are practically satisfied by connection with their country seats, but there is a great lack of information on the part of the local owners, who are unaware that the development of the Independent long-distance service will in the very near future furnish to every Independent exchange connections with whatsoever part of the country its subscribers may require. This condition renders dangerous to your interests the determined efforts the Bell company is now making to connect its toll lines with the smaller Independent exchanges, operating in communities which had been denied all telephone service during the whole life of the patents owned by the monopoly. The people are with the Independent companies, but to retain the support of the people the companies must remain Independent in fact, as well as in name. The best means of holding such companies in line is one of the subjects that should command your attention. Your business requires mutual understandings more than any other that I know of, because the success of each individual exchange depends in large measure upon all the others. The best road to substantial and sustained profit is through organization, such as you have in the National-Interstate Association, of which this body is an important and influential member. You are thus represented by delegates of your choosing, who, with delegates from other State associations, will convene next month for the consideration of business which concerns the telephone companies of the several States, insuring united action upon all matters of general interest."

Mr. Beers urged the necessity of all companies becoming members of the district associations. They thus become workers for the common good, each bearing its fair share of the burden. Territory in which each company operates should be developed to its fullest capacity, and exchanges united into compact system, operating under standard rules to furnish a service of standard excellence. He advised the adoption of a uniform system of accounts, likewise a standard sign in order that the Independent long distance service may be recognized everywhere.

Delegates to the Convention of the Indiana Independent Telephone Association

The district vice-president and the members of the executive committee have contributed largely to the success that has come to the association during the first year. Mr. Beers bestowed much praise upon the secretary for his efforts, which have done much to promote the success of the organization.

There was especial interest manifested in the reports of the vice-presidents from the district associations, as they were cal-

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culated to show the condition, progress and development of Independent telephony in the eleven districts of the State.

Theodore Thorward, of South Bend, vice-president of the first district, reported the Independent telephone cause in excellent condition in the seven counties of his district. There are seven Bell exchanges and 3,193 telephones in operation in this district, as compared to fifty exchanges and 17,295 telephones in operation by the Independents. Under such conditions it is not remarkable that the Bell company is willing and anxious to connect its toll lines with the prosperous Independent exchanges.

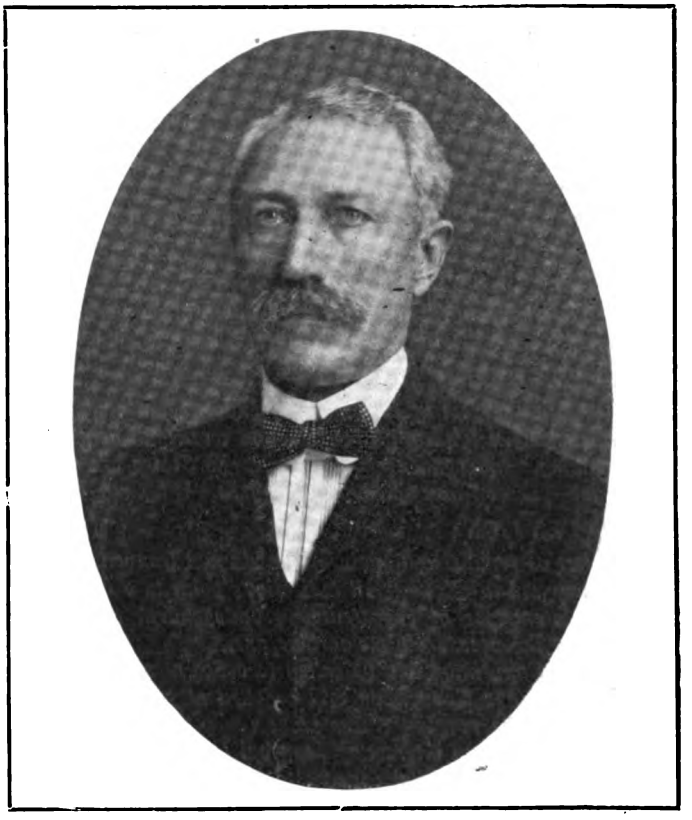
Wm. L. Moellering, of Ft. Wayne, vice-president of the second district, said the progress made by the Independents there is keeping pace with other parts of the State. The number of Independent telephones in use predominates so largely in his district that the Bell competition was scarcely perceptible. In many localities the field has been kept clear of Bell competition—especially is this true in the whole of Whitley county. As in other portions of the State the Bell manœuvers in every manner possible to induce companies to tie up with its toll lines, but the small companies realize the serious consequences of such an act and refrain from entering into any agreements.

Mr. Moellering urged that the memories of the Independents should be kept thoroughly alive to the fact that the Bell does not expect in any move that it makes toward tying up with an Independent company that any real benefit shall accrue to the Independents, but rather will tend to gradually cripple the smaller company. Meetings in his district are largely attended and the interest and harmony among the thirty companies of the association could not be better.

W. S. Uhl, of Logansport, vice-president of the third district, reported that in the eight counties comprising his district there are twelve companies which are members of the association, and that the membership represents 8,615 telephones of the 12,982 telephones in the district and 866 circuit miles of toll line of the 1,595 circuit miles of the toll lines in the district. There are 12,992 Independent telephones in service, as against 4,103 operated by the Bell people. Mr. Uhl said great progress was being made and that 2,000 telephones had been installed during the past seven months. The two district meetings held were well attended and much interest in the proceedings shown by members.

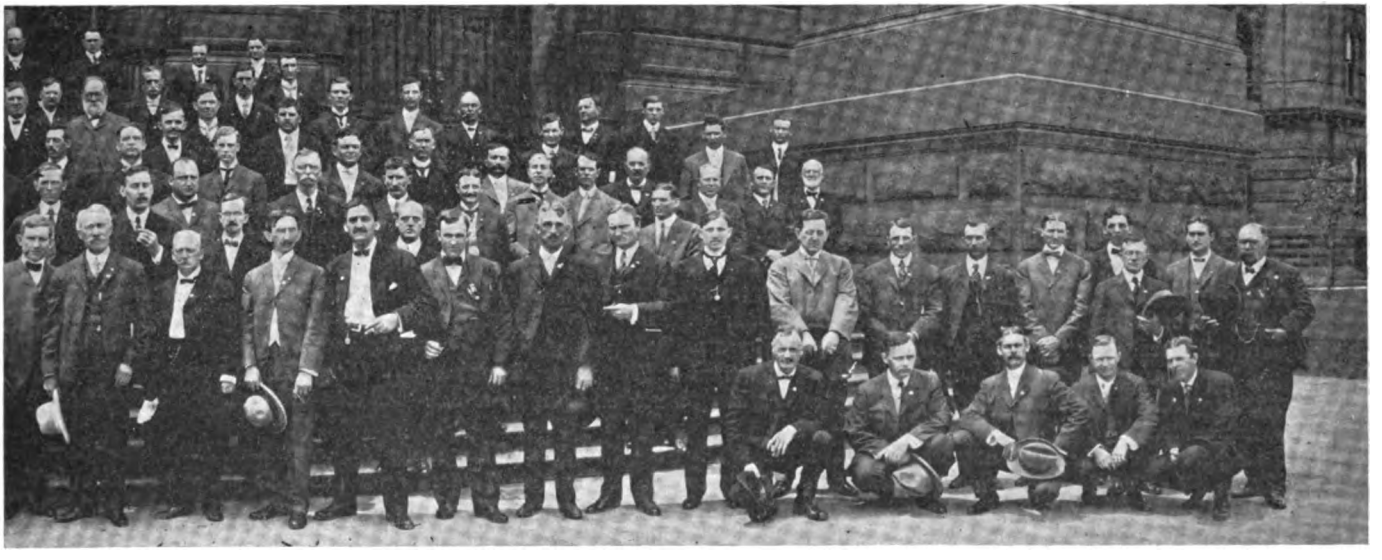
J. A. Browne, of the fourth district, made a brief but satisfactory report. Likewise, O. P. Friberg, of the fifth district, Earl Talbott, of the sixth district, and A. C. Lindemuth, of the eighth district. Mr. Lindemuth said he represented a Quaker community, but he desired to say that when it comes to fighting the Bell monopoly the Quakers forget all about being non-combatants. In all of these districts good meetings were held and considerable growth and development reported.

W. D. Curll, of Petersburg, vice-president of the ninth district, reported a complete organization with seven of the eight com-



A. C. Lindemuth, President of the Indiana Independent Telephone Ass'n.

panies in the territory as members. Mr. Curll said nearly all the companies in his district have increased their capital stock and increased facilities and extensions are constantly being made. A number of the companies have merged with the Central Home Telephone Company, of Louisville, and this will result in a vast amount of improvements and extensions. Mr. Curll described the Evansville situation and said while the Independents had suffered temporary defeat they would soon have a franchise in that city. The Pike County Telephone Company, in his district, some time ago lost its exchange by fire, but the fidelity of its patrons was shown by their disposition to wait until it could be rebuilt rather than accept free service which was offered by the Bell company. Mr. Curll said he was sorry to report that the Wabash Home Telephone Company, of Monroe City, had re-



Representing Telephone Companies Operating in Every County of the State.

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cently placed the Central Union business on its board and asked the association to take action thereon.

"All the Independent companies report increased business—more than they are able to handle," said Mr. Curll. The companies have adopted the Standard sign, and conditions are good. "We shall soon be shouting 'hello' in Evansville," said he.

Chas. D. Knoefel, of New Albany, vice president of the refreshments, Jesse W. Weik, of Greencastle, acting as toastmaster, started the flow of eloquence by telling a few good stories peculiar to the localities from which each speaker came. Dr. R. F. Blount was introduced as the godfather of Independent telephone associations, and related in an interesting manner his attendance at the birth of the Independent associations.

A. C. Lindemuth, of Richmond, gave an interesting account of the ten months' progress and related some amusing incidents

OFFICIAL BULLETIN NUMBER ELEVEN OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

MAPS:

The Independent toll line map of Ohio has been finished and is being published for distribution by subscription; a descriptive circular will be furnished if desired.

SUPPLY DEPARTMENT:

At the request of a number of Independent companies we have arranged to furnish inexpensive large card board "Shield" signs for use on construction work, bill boards, etc. Write for particulars. The use of the "Shield" is constantly spreading. Independent companies in 38 States are now displaying the emblem. YOURS should be among the number. If not—ask for illustrated catalog—free. Why not get a "Shield" button to wear to the Convention?

CONVENTION:

Let us remind you again of the Annual Convention at the Auditorium Hotel, Chicago, June 26th, 27th and 28th. It will pay you to attend. All indications point to a record breaking meeting. The importance of the gathering insures a large attendance of representative Independent telephone men from all parts of the country and no effort will be spared to make the occasion a memorable one.

The Convention will be called to order at 2 P. M. on June 26th. Mayor Dunne, of Chicago, will deliver the address of welcome. The Convention will adjourn at 5 P. M., June 28th, thus giving all who desire to stay until the last, an opportunity to take evening trains home.

An extremely interesting program has been arranged. There will be no lengthy "dissertations" nor "sermons," but important matters of vital concern to every Independent in the field will be presented in brief, carefully prepared papers, or short practical talks by men who are acknowledged masters of the subjects. All may share in the general discussions which follow. The question box, a feature at each session, will afford an opportunity for anyone to introduce important subjects for consideration. There will not be a dry hour throughout the entire program.

An informal banquet will be held in the Auditorium Hotel on June 27th, at 8:30 P. M. Some of the best after-dinner speakers of the country will be present to respond to toasts when called on by Col. J. D. Powers, of Louisville, Ky., who has agreed to preside as toast master. All who know Col. Powers appreciate the treat in store for those attending the banquet.

With a view of showing the substantial character of the Independent movement and the general prosperity of the companies comprising it, an exhibit of photographs of Independent plants has been arranged. To stimulate interest in this, there will be awarded first, second and third prizes of $15.00, $10.00 and $5.00 respectively, for the best photographs submitted. Every company is invited to participate in this contest. The awards will be made by a committee of Chicago photographers strictly on the merits of the photographs without regard to the size of building, so that all who take part stand an equal show. All photographs will be displayed in the hall during the Convention. Bring a photo of your building whether you care for a prize or not and help the committee make a good display.

The manufacturers and supply dealers are co-operating with the Association in making the Convention a success. They have arranged splendid exhibits of the latest and best in telephone equipment and supplies, besides sundry programs for the diversion of telephone men between sessions. You will not be allowed to get lonely while in Chicago.

Think of the opportunities presented by a gathering like this Convention. Nowhere else could you meet such an up-to-date representative body of Independent telephone men from all sections of the country, with whom you can exchange experiences and ideas, to your mutual advantage, regarding the various aspects of the business in which you are all interested. Through the exhibits you may become familiar with the most modern apparatus manufactured and through the program and discussions learn the latest and most improved methods of profitably conducting your business. In addition to this you get in touch with what is being done by your fellow Independents in all parts of the United States.

The progressive Independent telephone man who prides himself on being up-to-date, and who would keep abreast of the times, will certainly attend the Convention.

To accommodate the large number who are arranging to come, reduced rates, under the certificate plan, have been secured on all railroads. We want everyone who attends to take advantage of these rates and help make our plan to obtain them a success. Read carefully the conditions on page 345 of this issue.

The Association headquarters will be established at the Auditorium Hotel for the purpose of furnishing all necessary information and looking after the wants of visiting telephone men. We will also have a display in another part of the hotel of the various things handled by the supply department, besides the maps which have been prepared to date, by our drafting department. Drop in.

Again we urge, ATTEND THE CONVENTION! You cannot afford to miss it.

tenth district, made a characteristic report from the Knobbs. He said conditions were excellent, Independents were loyal and growing in facilities and popularity with the people. The meetings held were well attended and the interest manifested could scarcely be greater.

The evening session was in the nature of a smoker. After relative to the attempt of the Bell people to persuade the Quakers to forsake the Independents.

Theodore Thorward, of South Bend; L. A. Frazee, of Connersville; A. T. Payton, Huntingburg; A. L. Funkhouser, Evansville, and others gave short talks.

President Beers presided over the morning session of the

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second day, at which routine business was first dispatched rapidly. The committee on the constitution recommended a change in Article 7, relative to membership fee and annual dues, and also that Article 8 be amended so as to provide for the selection of a larger number of delegates from each company to attend the annual meetings.

The interest manifested in the address of Col. J. D. Powers, of Louisville, on "Independent Telephone Securities" brought out a good attendance. The address was read by Mr. A. L. Têtu, of Indianapolis.

At the conclusion of the reading of the paper a vote of thanks for the excellent paper was ordered sent to Col. Powers, together with the regrets of the association because of his absence.

A. C. Lindemuth, chairman of the executive committee, presented a resolution to the effect that a petition be sent to the Mayor and Board of Public Works of Indianapolis urging them to take favorable action on the application of the new telephone company for a modified franchise.

The committee on uniform methods of accounting made a partial report and asked for additional time to formulate such a system.

The committee on rates made a report to the effect that rates were inadequate and out of proportion to the increasing value of the service now being given. The committee recommended the gradual education of the people up to the fact that the companies must have more money to operate, improve and extend their lines. The committee recommended that all free business be cut out.

The afternoon session of the second day was given up to the election of officers, and resulted as follows: A. C. Lindemuth, Richmond, president; C. S. Norton, Indianapolis, secretary-treasurer; Jesse W. Weik, Greencastle; Theodore Thorward, South Bend; Thomas Davidson, Greensburg; C. D. Knoefel, New Albany; Wm. L. Moellering, Fort Wayne, executive committee.

The following delegates were elected to attend the convention of the National-Interstate Telephone Association at Chicago, June 26 and 28: M. E. Vrow, Elkhart; Geo. W. Beers, Fort Wayne; John L. Osborne, Veedersburg; A. L. Têtu, Indianapolis; C. S. Norton, Indianapolis; A. J. Payton, Rockport; A. A. Ulrey, Decatur; A. C. Lindemuth, Richmond; F. R. Strickler, Franklin; Henry Barnhart, Rochester; L. A. Frazee, Connersville; Jesse W. Weik, Greencastle; E. Hawkins, Noblesville. Alternate delegates selected were George T. Cox, Fort Wayne, and Frank White, Cortland.

The Independent Bulletin was made the official organ of the association, and a vote of thanks tendered president Beers and Secretary Norton for faithful services during the year.

The entire eighth floor of the Claypool Hotel was given up to the electrical manufacturing companies, and a more magnificent and interesting exhibit of the latest devices and telephone apparatus of all kinds was never made outside a national convention.

About thirty of the prominent telephone men enjoyed the hospitality of the representatives of the Stromberg-Carlson Manufacturing Company at luncheon Friday noon, and the representatives of many other companies contributed much to the pleasure and information gained by members of the association through their attendance at this convention.

BELL SUBSCRIBERS FORM PROTECTIVE ORGANIZATION.

STARTING with 150 members, the Telephone Subscribers' Association has been recently organized in Chicago. The object of the association is to protect subscribers to the service of the Chicago Telephone Company, particularly those in the downtown district of the city, from the so-called "petty tyrannies" which that company has inaugurated. A further object of the association is to safeguard the interests of its members who may be drawn into litigation. So much interest is being shown in the organization that it is expected that its membership will be rapidly increased.

PRELIMINARY PROGRAM OF THE ANNUAL CONVENTION OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

Auditorium Hotel, Chicago, June 25-28.

JUNE 25TH.

10 A. M.—Meeting of Permanent Committee.

1:30 P. M.—Meeting of Executive Council and Advisory Board.

JUNE 26TH.

2 P. M.—Convention called to order.

Address of Welcome, Hon. Edward F. Dunne, Mayor of Chicago.

Response, E. H. Moulton, President Twin City Telephone Company, Minneapolis, Minn.

President's Annual Address, Jas. B. Hoge, President National-Interstate Telephone Association.

Officers' Reports.

Appointment of Committee.

Question Box.

Adjourn for the day.

MORNING SESSION, JUNE 27TH.

Meeting called to order at 10 A. M.

Report of Entertainment Committee.

Discussion of and Action by the Convention.

Roll call of States.

Paper, "Official Organs—National and State," Chas. S. Norton, Secretary Indiana Independent Telephone Association, Indianapolis.

Discussion.

Paper, "Look for the Shield," R. A. Walker, General Manager Central Iowa Telephone Company, Iowa Falls, Iowa.

Discussion.

Paper, "Telephone Publicity—Appealing to Public Opinion," Mr. Ivy L. Lee, New York City.

Adjourn for lunch.

AFTERNOON SESSION, JUNE 27TH.

Meeting called to order at 2 P. M.

Report of Committee on Standard Forms of Accounting.

Discussion and action.

Discussion.

Address on the San Francisco Disaster by Mr. John Van Liew, President California Independent Telephone Association, Oakland, Cal.

Report of Committee on Standardization of Equipment.

Discussion and action.

Address, "Southern Toll Lines and Exchange Development," by a representative from the Southern States.

Question Box.

Adjourn for the day.

Informal Banquet, 8:30 P. M. Col. J. D. Powers, Louisville, Ky., Toast Master.

Speakers announced later.

MORNING SESSION, JUNE 28TH.

Meeting called to order at 10 A. M.

Report of Committee on Standard Operating Rules and Regulations.

Discussion and action.

Paper, Suggestions "How to Finance Small Telephone Properties," Theodore Gary, Vice President National-Interstate Telephone Association, Macon, Mo.

Discussion.

Reports of Outstanding Committees.

Discussion and action.

Presentation of New Business.

Question Box.

Adjournment for lunch.

AFTERNOON SESSION, JUNE 28TH.

Meeting called to order at 1:30 P. M.

Transaction of unfinished business.

Report of Nomination Committee.

Election of Officers.

Installation of Officers.

Farewell Address.—Speaker announced later.

Convention adjourns.

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THE EDITOR'S PAGE

REDUCED RATES TO CHICAGO CONVENTION.

DIRECTIONS for securing a return trip ticket at one-third of the regular fare have been issued by the National-Interstate Telephone Association, and are published upon another page of this issue. It is evident that to most of the people who attend the Convention this rate will furnish a means of making quite a substantial saving in the cost of the trip, and care should be taken to secure information which will prevent any failure to obtain the concession through lack of knowledge of the proper routine. The association has taken all the preliminary steps for obtaining this rate, and made the necessary guarantees. These guarantees, however, depend upon a sufficient number of members availing themselves of the privilege; so that it is as much to the advantage of others as for themselves that the first men should obtain the required certificates. It should be borne in mind that this is a place where the man who acts on the motto "Do it now" is likely to reap his reward in the saving of valuable time, as well as money.

PHOTOGRAPHS OF TELEPHONE PLANTS.

ONE of the features of the National-Interstate Convention at Chicago which promises to be very useful and interesting will be the exhibition of photographs of Independent telephone plants. It is an extremely good thing that the officials in charge of the arrangements for the convention have adopted this idea. It will be valuable not only from the amount of general information which will be conveyed in a manner which cannot be attained by any other method, but from the undoubted effect it will have in stimulating the use of the camera by telephone men.

Those who have had experience of this nature are aware of the great advantage which comes from the taking of photographs of points remote from the home office by men from headquarters who have occasion to take trips throughout the company's territory. Upon their return the record contained in a series of well chosen photographs enables the other officials connected with the management of the company to obtain what is the nearest substitute for knowledge acquired by direct personal observation which can be secured. The condition of lines from various points of view, such as the nature of the original construction, freedom from contacts with branches of trees, or proximity to foreign wires, is indicated by a photograph in such a manner as to be readily intelligible, and to convey definite information at a single glance. When special inspections of central office or sub-station apparatus are made another opportunity for the photographer occurs. If an expenditure of money for the correction of undesirable conditions is necessary it is preferable that those who have to make the decision should have all the information obtainable, and few people who have tried the plan will deny that a well illustrated report would in many cases be sufficiently more reliable than one containing only written information to fully justify the expense of taking photographs. It is extremely probably that the sending out of an assistant competent to obtain good photographs would in many cases be a most satisfactory substitute for the employment on special missions of one of the higher salaried officers of the company, who must spend a great deal of time in looking over the ground in order to pass judgment.

In the engineering work of all telephone companies many occasions arise where plans, no matter how carefully made, are found to be incomplete, and this is likewise true of notes. Some point is overlooked, and no definite information concerning it appears when knowledge is desired promptly. Securing it may mean a special trip with an attendant expense altogether out of proportion to the instrinsic value of the information sought. A complete set of photographs of equipment is extremely useful in such cases.

It is true that good telephone men who are accomplished photographers are not frequently met. Nevertheless, skill in photography sufficient to fulfill many of the demands of practical work may be readily developed. All the very large general engineering and manufacturing establishments maintain upon their pay rolls at least one photographer, and the officials of these companies find that his work pays extremely well.

Telephone men who have any inclination to follow this useful line will no doubt find it much to their advantage to develop their skill as far as possible by the choice for practice of subjects connected with their regular work. On the other hand, managers of companies who encourage the use of the camera by their subordinates will on the most unexpected occasions find that their efforts will have worked out to the advantage of the company. Those who visit the convention bearing this point in mind will probably see in the photographic exhibit much to confirm these views.

OPPORTUNITIES IN CANADA.

PROSPEROUS farms are coming into existence all over the Canadian Northwest, and business is increasing at a rate which will soon make this region one of the most important on the continent. The men who are changing this place, which was not so very long ago a wilderness, into one of the most wonderful industrial centers in the world are among other things just waking up to the value of telephone service.

Also, with their increased prosperity, they are able to devote more time to social affairs, and here too the telephone has its advantages, enabling them to adopt a means which will bring most widely separated houses into close connection. Large numbers of rural lines will be built during the next year or two in Manitoba, Alberta and Saskatchewan. A reliable correspondent says that there will be literally hundreds of new companies organized to perform this work. The people at present are almost wholly uninformed as to the sources from which telephone material may be obtained, and it would seem as if there must be an admirable opportunity for the establishment of supply houses in one or more well chosen localities. Such an enterprise should not only be able to build up a large and substantial business, but would be likely to materially assist in the development of this important aid to the industries of the country. There are people in some of the cities who are anxious to see such a business established, and will be glad to give more definite information.

THE INDIANA CONVENTION.

REPORTS of material progress in business affairs and of a whole hearted devotion to Independent telephony as a cause by the district vice-presidents were probably the most striking features of the recent convention at Indianapolis. Most cheering news was furnished, not only of the upbuilding of Independent telephone systems admirably fitted to serve the needs of the public, but of the organization into a compact body, which is calculated to work with a considerable degree of efficiency, of numerous small companies which cover the different sections of the State. The effect of work of this sort, when conducted with the spirit shown at this meeting, cannot be overestimated. The fact that this condition has been brought about in so brief a time since the original plan of organization was proposed gives the Indiana association a most valuable record of accomplishment.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HIGHWAY RIGHTS IN NEW YORK.

Our company is operating under a State charter (New York). We are continually hampered in the construction of our lines in the country districts and in cities and incorporated villages, where we have local arrangements, by property owners preventing our setting poles.

I would like to have your opinion on the following points:

1. In country districts, where we desire to set a pole or poles in front of a man's property in the highway where no apparent damage will result to trees or property, what right has he to prevent our doing so, providing we are willing to pay a reasonable amount for the privilege?

2. If poles are placed in the highway in opposition to property owner's wishes, can he legally require you to remove them?

3. In case where we have secured permits and had location assigned to us by the duly authorized officials of city or village, can property owners prevent placing of poles?

4. Can our company condemn a right of way either on highway or property? W. J. C.

The above questions will be answered in the order in which they are asked.

1. The answer to this question depends upon the ownership of the highway. If a man who owns the property in front of which the pole is placed, owns to the center of the highway, and the public owns merely the right of way in the highway, but not the fee or title to the highway itself, the landowner may prevent your setting a pole in front of his property, even though no apparent damage will result to trees or property. In the absence of condemnation proceedings he is not bound to accept a reasonable amount for granting you the privilege of setting your poles in the highway, or to give you that privilege at all. See Eels v. Teleg. Co., 143 N. Y. 133, 38 N. E. 202, 25 L. R. A. 640. If the property owner, on the other hand, does not own to the center of the highway, he cannot interfere with you at all, and has no right to surrender to you. This is in the absence of any damage to trees or property. Halleran v. Bell Telep. Co., 71 N. Y. S. 685, 69 N. E. 1124.

2. If poles are placed in the highway in opposition to the wishes of the property owner who owns to the center of the highway, he can legally require you to remove them. A property owner who does not own to the center of the highway cannot require you to remove them at all.

3. This question, like the other two, depends upon the title of the property owner in the highway. Where the public owns the fee in the highway and you have secured permits and had location assigned by the proper officials, property owners cannot prevent your placing poles. If the property owners' rights extend to the center of the highway, the permission from the municipal authorities binds the public, but does not dispose of the rights of the property owner in the highway, and he can prevent you from placing your poles.

4. Your company can condemn a right of way either on a highway or property. Deusenberry v. Mutual Telep. Co., 11 Abb. N. C. 448.

ANNEXED TERRITORY SUBJECT TO FRANCHISE TERMS.

AN ordinance of the city of Chicago granted to the Chicago Telephone Company the right to use the streets and limits of the city for twenty years, and required the company to file with its acceptance of the ordinance a schedule of rates for telephone service "within the limits of the city" and prohibited the company from increasing such rates to its present or future subscribers. The company filed a schedule in compliance with the ordinance. Afterwards there was annexed to the city of Chicago other territory which had previously been within the limits of other minor municipalities, such as towns or villages, which upon the annexation ceased to exist. These towns or villages had previously granted the company the right to use their streets for telephone business upon certain conditions, but without restriction of time or condition as to rates. Upon the annexation the company claimed that it had acquired vested contract rights in the annexed territory under the ordinances of the municipalities that formerly existed there, and that these contract rights were not affected by the ordinances of Chicago and that in the annexed territory the restriction as to rates contained in the Chicago ordinances did not apply. The city of Chicago instituted a suit for the forfeiture of the franchise of the telephone company, and in this case it was held that on the annexation to the city of other towns and villages their local ordinances terminated and the telephone company was bound to furnish telephone service in such localities under its original city ordinance. In the same case it was decided that the telephone company was not entitled, after the annexation, to limit its service at the rates fixed in the ordinances to the same kind of service that had been in existence when the original grant from the city of Chicago was made. These were the holdings of the Supreme Court of Illinois which reversed an order of the Cook County Circuit Court dismissing the suit. People v. Chicago Telephone Co., 77 N. E. 245.

HIGHWAY REGULATIONS IN OHIO.

THE Ohio Postal Telegraph Company brought a suit against the commissioners of Sandusky county, Ohio, for an injunction to restrain the commissioners from enforcing a resolution requiring the company to remove its telegraph line from the center to the north side of the Maumee pike on the ground that the present location of the poles seriously incommoded the public in the use of the highway. In 1893 the county commissioners in consideration of $200 had granted the company permission to construct its lines of poles and wires along the highway, and in pursuance of this authority, the company had built its line along the north edge of the roadway. In 1889 the county commissioners granted to the Toledo, Fremont & Norwalk Railroad Company the right to build and operate an electric railway along the southern portion of the same roadway. The testimony showed that it was impracticable for heavily loaded wagons to pass one another on the roadway between the electric line and the telegraph company's poles. The Circuit Court of the United States for the Northern District of Ohio gave judgment in favor of the telegraph company, but this judgment has been reversed by the Circuit Court of Appeals, which lays down the proposition that the primary purpose of a highway being for travel and transportation, its use by a telegraph company to facilitate communication is subordinate to its use by the public for the primary purpose. It held, under the statutes of Ohio, which provide that the use of a public road by a telegraph company "shall not incommode the public in the use of such road," that a board of county commissioners, which has been given control of a pike by the State, cannot grant to a telegraph company the right to maintain its poles and wires upon it except subject to such statutory limitation. A grant from a board of county commissioners, it was held, cannot preclude it or a succeeding board from ordering a removal of such poles and wires, if at any time through changed conditions their location in the highway shall incommode the public in its use, and the company's action in ordering a removal will not be interfered with by the courts unless an abuse of discretion is shown. The whole matter, the court decided, was within reasonable control of the commissioners. Ganz v. Ohio Postal Teleg. Cable Co., 140 Fed. 692.

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IN THE OPERATING FIELD

ENTHUSIASTIC MEETING OF CENTRAL ILLINOIS ASSOCIATION.

ONE hundred thousand telephones and some eleven hundred miles of toll line were represented at the annual convention of the Central Illinois Independent Telephone Association recently held at Peoria. The general tone of the reports given by the officers and members was that the Independents were making great gains against the Bell company, several instances being cited to prove the statements.

In Tazewell county alone the Independents have 13 exchanges and 2,972 telephones, while the Bell has but 2 exchanges and 643 telephones.

It was decided to establish a clearing house through which all toll reports will pass, and Peoria was selected for this purpose.

J. S. Daily, Chillicothe, is secretary of the organization.

The report of the Interstate Company of Peoria, which stated that it had installed nearly 3,000 instruments in eight months, was enthusiastically received.

Amongst the towns and cities represented were Rock Island, Galesburg, Springfield, Bloomington, Petersburg, Pekin, Canton, Monmouth, McComb, Henry, Chillicothe, Tremont, El Paso, Eureka, Bradford, Green Valley, Kewanee, Lacon, Washington, Delavan, Rutland, Lostant and Metamora.

The new officers elected for the ensuing year are: President, Sidney Daily, Chillicothe; vice president, W. G. Olwin, Peoria; secretary and treasurer, H. W. Bullock, Eureka; executive committee: J. W. Barrett, Pekin; M. B. Farwell, Bloomington; W. H. Ames, Tremont.

INDEPENDENT DEVELOPMENT IN NORTHERN MAINE.

ALTHOUGH incorporated less than a year ago, the Independent Telephone Company of Houlton, Me., has secured upwards of 550 subscribers. The company is now considering extensions to the northern part of the county which, when completed, will place a number of small towns and villages in direct connection with Houlton, besides enabling the farmers to secure first class service at a moderate cost. The rates charged are fifteen dollars for business and twelve dollars for residence and farm line service.

HOME COMPANY OF SAN DIEGO, CAL., TO BUILD NEW LINES.

PLANS to extend the system of the Home Telephone Company of San Diego, Cal., are under consideration. It is proposed to build a line through the Imperial valley to connect with Julian and Cuyamaca. The towns of Brawley, Calexico, Holtville, El Centro, and Heber, besides several smaller places, will thus be able to get direct connection with San Diego and Los Angeles. It is expected that construction will start within three months.

APPROVAL OF PUBLIC GREETS OPENING OF INDEPENDENT SERVICE IN COUNCIL BLUFFS.

STARTING with a list of over 2,000 subscribers the Independent Telephone Company of Council Bluffs, Ia., recently commenced business. The inauguration of Independent service in that city places it in direct communication with about 20,000 subscribers in Southwestern Iowa. Over $125,000 has been spent in constructing the system and so great is the demand for telephones that it is expected that a further sum of $50,000 will be expended to take care of its immediate growth. The company has its own exchange building, which cost $12,000, and it spent $20,000 in placing the circuits through the business part of the city underground. The switchboard has an ultimate capacity for 5,400 lines.

The first day the exchange was opened upwards of 3,000 visitors passed through the building and examined the apparatus. Flowers were distributed to all who accepted the invitations to view the building and an orchestra was in attendance. The reception was arranged by C. H. Judson, who had charge of the building of the new system, and manager C. A. Laubach. President F. J. Day of the Independent Telephone Company was assisted on the reception committee by his associates on the board of directors, who are F. R. Davis, E. H. Merriam, F. H. Keys, E. H. Lougee, Dr. H. B. Jennings, C. A. Beno, T. G. Turner and W. H. Kimball.

The people of Council Bluffs are very much alive to the benefits in the way of increased business which will now come to the city and contracts are being closed for service faster than the equipment can be installed, although a corps of instrument men is installing telephones at the rate of sixty a day.

CUYAHOGA TELEPHONE COMPANY ISSUES FINANCIAL REPORT FOR MARCH.

EARNINGS of the Cuyahoga Telephone Company of Cleveland, O., for the month of March in the present year compared with the statement for the corresponding period in 1905, have just been issued. The statement shows a splendid gain in all lines. A surplus for three months of $40,297 is shown. This would indicate a surplus for the year of over $160,000. To pay dividends on the outstanding preferred stock requires $60,000 a year, leaving $100,000, which is over 6 per cent. on the common stock. Here is the statement:

	Mar. 1906.	Mar. 1905.
Gross earnings	$54,224.91	$40,473.42
Expenses	24,780.32	21,354.38
Per cent. expenses of earnings	45.70	52.76
Net earnings	29,444.59	19,119.04
Additional income	1,573.31	1,996.86
Total income	$31,017.90	$21,115.90
Deductions:		
Taxes	$ 2,320.92	$ 1,617.61
Bond interest	11,250.00	9,437.50
Miscellaneous charges	3,796.43	2,848.17
Total	$17,367.35	$13,903.28
Surplus for period	$13,650.55	$ 7,212.62
Surplus for two previous months	26,647.16	13,238.44
Surplus for three months	$40,297.71	$20,451.06

BACK NUMBERS OF THE AMERICAN TELEPHONE JOURNAL WANTED AT $1.00 APIECE.

WITHIN a few days requests have been received for forty back numbers of THE AMERICAN TELEPHONE JOURNAL. The person making the inquiry is very anxious to secure these numbers and has authorized us to make an offer of one dollar for every copy obtained in good condition. Full particulars relative to the issues wanted will be found in the advertising section on page 11. If any of our readers are willing to part with any or all of the numbers mentioned we would consider it a favor if he would notify us at as early a date as possible.

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NEW PLANT BEING INSTALLED IN ALLENTOWN, PA.

WORK upon the new plant of the Consolidated Telephone Company at Allentown, Pa., is progressing rapidly. The entire lower floor of the company's building, with the exception of the front office, has been remodelled to accommodate the switchboard. Provision has been made for a future extension of the equipment to a size forty per cent. larger than the present installation, which is for 1000 lines.

Each line is equipped with four-party selective signalling apparatus, so that 4,000 subscribers can be given service. A three-position toll board will be employed for long distance connections. All the apparatus has been received, and it is expected that the new system will be in operation within a very short time.

CUMBERLAND COMPANY LOSES FAVOR IN ELKTON, KENTUCKY.

THE Cumberland Telephone Company a few days ago notified the citizens that it would withdraw all service from Elkton, Ky., and the county. It closed its exchange for about two days, and began moving telephone instruments.

The cause of all this was that the city council passed an ordinance to the effect that all companies not having a franchise for doing business in the city of Elkton should pay a fine of $50 per day for every day they operated from that time forth.

When the citizens observed the Cumberland company taking out its instruments, and making the statement it was going away, they signed an agreement to stand by the city council, and the city council was called to pass a resolution reclaring the occupancy of the streets a public nuisance. At this council meeting the Cumberland Company endeavored to run through a franchise without any restriction. The members of the council, however, held their ground and said the company must buy a franchise with a stipulated rate, the same as all other corporations, or be subject to action as trespassers. The Cumberland company declared it would not purchase a franchise containing a stipulated rate, and before doing so it would remove every instrument and all material from the town of Elkton. The Home Telephone Company immediately made up plans and specifications for giving the town of Elkton telephone connection to various surrounding Independent lines. Upon learning of this action the officials of the company sent to call on the city council a representative who stated that "The proper officers" did not know of this action and that they would certainly purchase a franchise with a stipulated rate which was nothing more than right. He stated that "It was a shame that the citizens of the town of Elkton had been cut off from telephone connection without their knowledge and the company would in fact be very glad to do anything in its power to give the people of Elkton anything they desired." So the Cumberland exchange is again going full blast, while the Home people are rapidly building. The sentiment aroused among the people is so strongly against the Bell company that it is expected that within a short time only a pay station will be left to the Cumberland company in Elkton.

REDUCED RATES TO CHICAGO CONVENTION ON ALL RAILROADS.

ARRANGEMENTS have been made with all railroads for reduced rates returning from the convention to all points from which one-way fare to Chicago is 75 cents or upwards, providing not less than 100 persons are in attendance who have complied with the following conditions:

Full fare, first class, through tickets to Chicago must be purchased not earlier than June 21st nor later than June 27th.

A standard form of certificate properly filled out and signed by the ticket agent must be secured at the station where the ticket is purchased. The agent issuing such certificate will request the purchaser to sign it with ink in his presence.

If through tickets or certificates cannot be obtained at any station the agent will advise the nearest junction point, where they may be secured. Be sure to get a certificate. Agent's or conductor's receipts for fare paid *cannot be accepted* instead.

Upon arriving in Chicago deposit certificates at the convention headquarters in the Auditorium Hotel with Mr. J. A. Harney, assistant secretary, for his endorsement. When 100 or more have been so deposited, they will be visèed by a special agent of the railroad who will be in attendance July 27th and 28th for this purpose, and who will collect a fee of 25 cents from persons presenting them for each certificate visèed. Holders of certificates leaving before his arrival or before 100 certificates have been deposited with the assistant secretary, or who present certificates after the special agent's departure, cannot take advantage of reduced rates under this plan.

Ticket agents at Chicago will sell return trip tickets to starting points at one-third of the regular first class fare to each holder of a properly endorsed and visèed certificate, providing such holder is the person to whom the certificate was originally issued and whose signature appears on it. Neither certificate nor tickets secured under this arrangement are transferable, and for the purpose of identification ticket agents at Chicago will request purchasers of return tickets to sign certificates in their presence. Tickets or certificates presented by unauthorized persons will be confiscated. The association has guaranteed to redeem at regular tariff rates all tickets secured under this plan which are misused or presented for sale.

The railroads request that all desiring to take advantage of the reduced rates advise their respective ticket agents as far ahead as possible, so that through tickets and certificates may be prepared. They further request that these be called for not later than thirty minutes before departure of the train, in order to avoid confusion at stations. If necessary, further particulars can be obtained from local ticket agents.

Please note the foregoing carefully. There will be several hundred people from all parts of the country attending the convention, but unless 100 or more certificates are presented to the special agent no reduction on any of them can be allowed, regardless of the number actually present. Everyone attending the convention is therefore urged to secure certificates and observe all other necessary conditions, so that the association's plan for securing reduced rates may be successful.

THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.
Cleveland, Ohio, May 18, 1906.

A REMINDER FOR BUSINESS MEN.

TELEPHONE

Just delivering 25,000 Directories. Each one used at least ten times a day. Is our special business classification worth anything to you? Exclusive in our Directory.

Are you in the book; have you wires enough?

The Cuyahoga Telephone Company
Electric Building Prospect Street

REPRODUCED herewith is one of the newspaper advertisements of the Cuyahoga Telephone Company. This is an excellent example of the higher class of reading copy issued in the daily papers. It is a direct appeal to men of a special class. To those whom it is especially desired to interest it makes a much stronger appeal than would a much larger amount of space devoted to statements of general application.

ANOTHER OHIO COMPANY MOVES INTO A LARGER OFFICE.

NEW quarters have been secured for the Hamilton, Ohio, Home Telephone Company. The business of the company has ben growing so rapidly under the efficient management of Mr. W. Gilbert Thompson that its present location has proved inadequate. Four floors of a modern building have been leased and the work of transferring the equipment is now going on.

The floors secured include a basement in which the storage battery plant will be located, as well as a storage room for line construction supplies. The general offices will be located on the first floor and the operating room together with operators' quarters on the third floor, while the wire chief's department will be on the fourth floor. When the changes have been completed the company will be in a position to handle the probable increase for some time to come.

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QUERIES

PRIVATE LINE ARRANGEMENT.—(698.)

We have a subscriber, A, in a town, X, who wants connection with two concerns, B and C, in a town, Y, twenty miles distant, by means of a private line. He wants to be able to talk to B without C's being able to listen and vice versa. We have tried to arrange switches at stations B and C so that either could cut the other off, but we have not been able to get a satisfactory arrangement. Can you help us? A is not willing to have the line run through our local switchboard at Y, as he wishes his connection to be absolutely private.

It would be extremely difficult to make any arrangement of switches whereby B and C could cut each other off when either wished to talk to A. If the stations are not too far apart, the following simple circuit can, we believe, be worked successfully. Arrange two magneto sets with an extra contact on the switch hook, connect these two contacts by means of a third wire, which includes a buzzer and several cells of battery in series. When both receivers are removed the buzzer will operate, the current returning over the line wire, and will set up a noise in instruments B and C which will prevent either from hearing and will advise A that both parties are on the line. This will also serve for a busy test to B, who might want to use the line while C was using it and vice versa.

CAPACITY OF CONDENSER.—(699.)

Will you please explain the method of finding the capacity of glass condenser constructed as follows: Glass dielectric size 5 inches by 4½ inches and 1-32 inch thick. Two pieces of tin-foil, size 4⅞ by 4¾ inches. I saw an item in a copy of February 17, 1906, in reference to telephone lines being affected by the wireless. Having trouble of this nature to contend with I constructed a number of glass condensers of different sizes and tried them, cutting them in on protectors at substation, getting the best results from the one I mentioned above. It not only stops the arcing, but it stops the noise, giving you a clear line, and does not interfere with the transmission. J. R.

The capacity of a condenser may be computed in microfarads by the formula

$$\frac{K\ S}{4{,}450{,}000\ d}$$

where K = specific inductive capacity of the dielectric,
S = square inches surface of either electrode,
d = inches separation of electrodes.

The specific inductive capacity of glass for telephone frequencies is 6.

The surface mentioned by our correspondent isf 21.3 sq. in.

The separation mentioned is 1-32 inches.

Substituting in the formula we have

$$\frac{6 \times 21.3}{4{,}450{,}000 \times 1\text{-}32} = .00092 \text{ M.F.}$$

This is equivalent to the capacity to ground of about 50 feet of underground cable and we should expect that it would be hardly sufficient to stop sparking across the carbons in cases of violent disturbance from a wireless station.

As a practical form of condenser we would suggest taking three sheets of heavy paraffin paper a foot square and pasting tin-foil 11 inches square on both sides of one sheet. Then placing the remaining sheets above and below, roll the whole into convenient compass.

The condenser should in all cases be tapped across the carbon plates as close as possible so as to have very short lead wires.

NOISE FROM ELECTRIC LIGHT CIRCUITS.—(700.)

A correspondent writes: "Regarding the query of C. F. L. (No. 694), in your issue of May 12, would say that I think the assumption by the writer that the electric light circuits are not grounded does not always apply. If the circuit is constructed on the three-phase plan it can be safely assumed that the neutral wire is not only grounded at the machine, but also grounded at every transformer to comply with the requirements of the Board of Fire Underwriters. In a large number of Western cities, at least, this rule is enforced to the letter, notably so in Chicago.

"If C. F. L.'s cables are well grounded at both ends I am inclined to think that his trouble arises from induction in the open wires leading to his house connections.

"It may also be possible that his cable ground is of a different potential from that of the electric light ground; in which case a ground wire connecting water mains and gas mains, in addition to an earth plate, might remedy his trouble. Some companies prefer to insulate their cables as well as possible by means of marlin hangers at every point except at the office, while others go to the other extreme and ground them thoroughly at both ends in order to equalize potential differences. These, however, must be treated largely as local condition." If there is any further information to be obtained on this point we shall be glad to hear from those who have had useful experience.

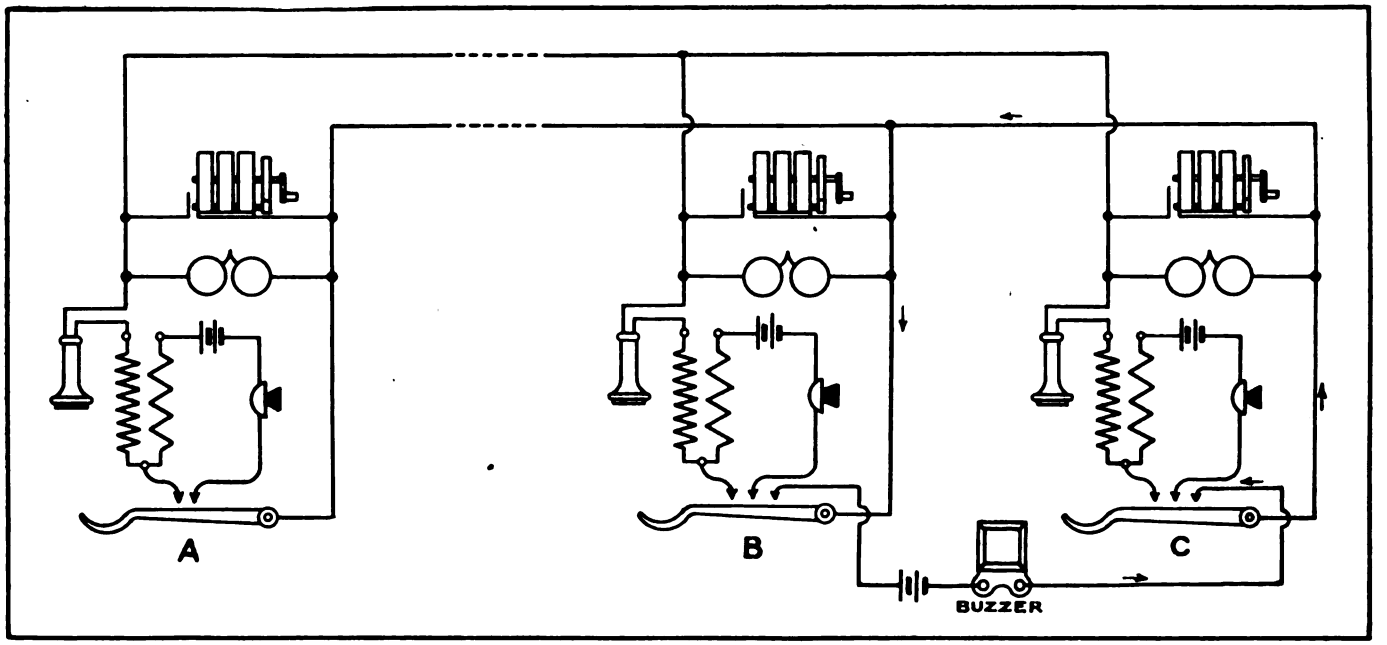

Fig. 698.

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THE SYSTEM AT DECATUR.

(*Continued from page 337.*)

they rest against an insulated stop, and are normally under tension, which insures a positive connection when the plug is inserted.

The line lamp jacks are built in conjunction with the associated answering jack and mounted on a strong brass base. The lamps are supported in a spring collet brass socket, provided with an opalescent disc. The socket, with lamp, may be easily removed from the front of the board. The lamp jack springs are so constructed that the lamp can be inserted only so far that the terminals will make proper contact with the jack springs.

The combination lamp and answering jacks are firmly clamped to a strong steel mounting plate by the ferrule of the jack passing through the mounting plate from the front and threading into the base of the jack. The ferrule is insulated from the mounting plate by a hard rubber bushing. The jacks are set into a hard rubber milled face plate, insulating the frame and preventing the jack from turning out of position. The clearing-out lamp and also the pilot lamps are so constructed that they may readily be removed from the front of the board, facilitating the testing or changing of lamps in case of defective signals.

For illuminating the lamp signals and operating the relays, operators' transmitters, etc., the system is provided with a storage battery plant and regular power equipment. The battery plant consists of twelve cells of lead-lined wood tank, Chloride Accumulator storage batteries, of sufficient size to meet the requirements of the present equipment for a period of twenty-four hours without recharging. The capacity of the tanks permits the batteries to be enlarged by adding the necessary elements as the plant is increased until the ultimate capacity of the switchboard is reached with the entire system changed to operate upon a full central energy basis.

The charging machine is of sufficient size to operate the exchange when completed to its ultimate capacity, and is built to operate from a 110-volt direct-current lighting circuit. The motor and dynamo of the charging set are connected by a flexible insulated shaft, giving them the appearance of a tandem machine. The dynamo end is of a necessary capacity to generate sufficient current at a suitable potential to meet the maximum demands of the storage batteries when completed, to supply the ultimate capacity of the switchboard when operated as a central energy system. The charging machine runs very quietly and without undue heating. The power plant is also provided with a Roth dynamotor, built to operate from a 110-volt direct-current lighting circuit, with a secondary output of 100 volts alternating. There was also furnished an auxiliary ringing machine built to operate from a 24-volt storage battery plant, having a secondary output of 100 volts alternating. The ringing machines are mounted on a heavy iron table, provided with a hardwood top, supported on solid soft rubber balls resting on a wooden frame. The table is provided with a marble front, to match the power board.

The power board contains the necessary ammeters, volt meter, volt meter switch and the required switches and other apparatus for properly controlling the power equipment. The power board equipment is mounted on a heavy marble slab, supported on a strongly constructed iron frame.

A view of the relay track and frames is shown. The distributing frame is a combination main and intermediate rack. The line side is provided with 1,300 pair carbon block lightning arresters and Kaisling self-soldering heat coil protectors. The distribution of the lines is done with flame-proof jumper wire. The cable work between the relay rack, distributing boards and the main switchboard, is carried on special overhead iron cable chutes, and is connected in a neat and substantial manner.

The equipment was furnished and installed by the International Telephone Manufacturing Co., of Chicago.

While re-equipping the plant, the location of the exchange was changed to a position nearer the centre of traffic, and in order to provide for the large increase considerable additional cable was put into the conduits and on the heavy aerial leads. On the first page is shown a photograph of the interior of a man-hole with the cables when testing and straightening out the cable and records while cutting over the exchange.

This installation is an interesting example of the type using a lamp signal multiple board for generator-call systems with grounded line construction, as well as of what is known as "growing exchange" system, constructed originally for generator-call telephones and so arranged that it may be changed at any time to full central energy without discarding any of the apparatus installed.

CITIZENS COMPANY OF GRAND RAPIDS HOLDS ANNUAL MANAGERS' MEETING.

ENTHUSIASTIC co-operation formed the keynote of the annual meeting of the managers of the Citizens Telephone Company held at Grand Rapids, Mich., on May 10 and 11.

In addition to about thirty of the Citizens Company's managers, a few representatives of outside systems were present, namely: Clark Smith, of the Grand Ledge Telephone Company; Wm. Robinson, general manager of the Citizens Telephone Company of Muskegon (a separate organization from the Grand Rapids company); H. H. Hutchins, of the Saugatuck & Ganges Telephone Company; F. M. Howard, of Flint, with the Saginaw Valley Telephone Company; H. T. Clough, manager of the Union Telephone Company's Owosso exchange, and W. J. Melchers, general manager of the Union Telephone Company.

During the sessions, which started each morning at nine, several very interesting and instructive papers were read and discussed. The following is a list of these papers:

Address of Welcome, E. B. Fisher, Secretary of Citizens Telephone Company; Monthly Reports and General Office Work, G. C. Britain, Auditor Citizens Telephone Company; Suggestions, C. E. Tarte, General Manager Citizens Telephone Company; Requirements of a Successful Local Manager (by request), H. T. Clough, Manager Union Telephone Company, Owosso; Daily Record of Rental and Toll Revenues, C. E. Smith, Manager Citizens Telephone Company, Cadillac; Keeping in Touch With the Details of the Business, F. V. Newman, Manager Citizens Telephone Company; Rural Collections, D. H. Owen, Manager Citizens Telephone Company, Lowell; Construction Hints, A. Stacey, Superintendent of Construction, Citizens Telephone Company; Some Experiences of a Traffic Manager, G. F. Stratemeyer, Traffic Manager, Citizens Telephone Company; Co-operation of Local Managers. F. C. Hughes, Manager, Citizens Telephone Company, Lansing; Courtesy, J. P. Badour, Manager, Citizens Telephone Company, Allegan; Care of Apparatus, E. Land, Superintendent of Equipment, Citizens Telephone Company; The Value of Discipline in Central Office Management, A. A. Burch, Manager, Citizens Telephone Company, Battle Creek; The Rural Subscriber, F. L. Francis, Manager, Citizens Telephone Company, Portland; Errors, W. S. Vivian, Manager of Clearing House; and The Importance of Knowing Your Subscribers, H. Taylor, Manager, Citizens Telephone Company, Marshall.

On the night of Thursday, May 10th, a banquet and smoker was given to the visiting managers and to all of the male employes in the Citizens Telephone Company's Grand Rapids exchange. The gathering took place in the company's building and was attended by one hundred and sixty. The fun started at 7 P. M., and continued until about 11.30. The entire program was furnished by the Citizens Telephone Company's employes, and included speech making, stories, vocal and instrumental music.

These meetings, which have a permanent place in the company's policy, are very pleasant and helpful to the men who are deputed to handle the company's systems.

RAPID INDEPENDENT DEVELOPMENT TAKING PLACE IN TUSCARAWAS COUNTY, O.

THE Tuscarawas County Telephone Company has exchanges at New Philadelphia, Canal Dover, Uhrichsville, Dennison, Newcomerstown, Mineral City, Tuscarawas and Midvale, with over 3,000 subscribers.

Tuscarawas county is one of the richest in the State for its mineral deposits. It has a population of over 70,000 and is the seventh county in the State in the number of inhabitants.

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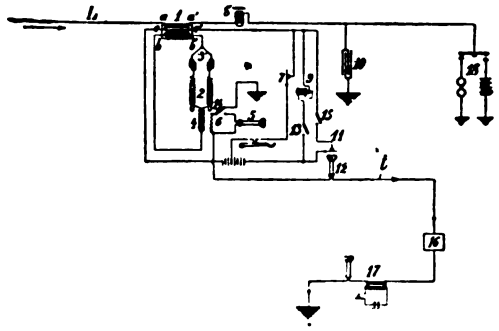
TELEPHONE PATENTS

COMPOSITE SYSTEM.

Carlo Turchi, Ferrara, Italy, patents (No. 809,865; dated Jan. 9, 1906; filed April 15, 1903; serial No. 152,736) a combined telegraph and telephone system.

In this invention means are disclosed for the simultaneous operation of telephone and telegraph instruments over a single



grounded line. To accomplish this result the inventor provides besides a line transformer, or repeating coil, a separator. Referring to the illustration, 1 is the transformer having 3 windings. Coils $a\,a^1$ and $b\,b^1$ belong to the receiving telephone and coil $c\,c^1$ is in circuit with the transmitter and signaling instrument. The separator 2 which is the prime feature of the invention and which is designed to allow only telephone currents to reach the telephone, consists of a closed circuit which receives the telephonic and variable portions of the telegraphic currents through the winding $b\,b^1$ of the repeating coil. This circuit is split into two branches 3 3, which each contain in series self induction and capacity of predetermined quantities. The branch circuits are then differentially wound around soft iron core 4 before they are again united. A winding 6 also surrounds this core and forms the secondary winding, included in circuit with which is a receiver 5. In operation the inventor claims that by adjustment of the capacity and self-induction constants of the separator two separate currents of different frequencies can pass through the differential coil 4, one of which will not be able to set up a magnetic effect sufficient to cause the receiver 5 to respond, while the other will.

The transmitter 7 is included in a local circuit including coil $c\,c^1$. For signaling purposes, owing to the fact that an ordinary generator would operate the telegraph relays, special apparatus is devised. This consists of an interrupter 9 and a sounder 8, in the form of an ordinary receiver. Closing switch 13 sets the vibrator 9 in motion and the interrupted current is transmitted through the repeating coil to operate the sounder 8. Line condenser 10 is provided to close the circuit for telephoning at a time when the act of telegraphing would momentarily open the circuit. If it is desired to connect a subscriber to the circuit, switch 14 would be connected to ground and the circuit completed through receiver 12 and switchboard 16 to ground at the substation. Transmission from the substation direct being impracticable, on account of the weakened condition of the current after passing through the separator, a relay is interposed. This consists of receiver 12 and transmitter 11. Switch 15 is closed, placing transmitter 11 in series with coil $c\,c^1$. The telephone 12 speaks into this transmitter and the words are transmitted in the usual manner; 18 represents the usual telegraph station.

SUPPORT FOR HEAD RECEIVERS.

Kelley M. Turner, New York, N. Y., patents (No. 817,457; dated April 10, 1906; filed January 18, 1906; serial No. 296,653) a support for head receivers.

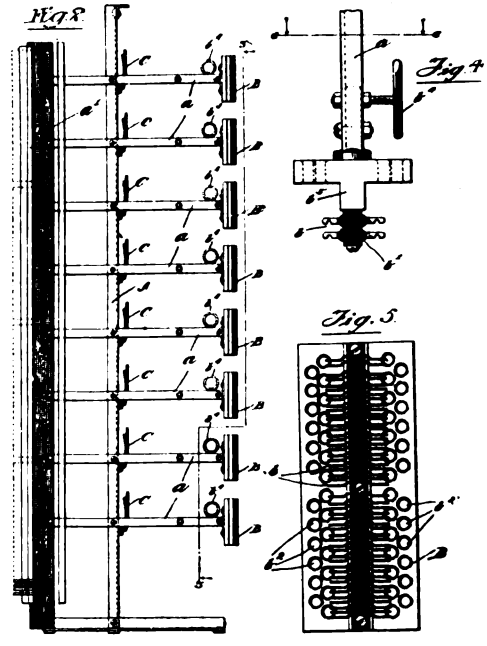
The object of this invention is to provide a means whereby the head band can be folded into a very small space when not in use. This the inventor accomplishes by dividing the supporting band into two parts and joining them together by a pin or rivet, which forms a pivot for folding purposes. The clip or fork to hold the receiver is also pivoted to the band. The ability to rotate the members of the band and its flexibility accomplish the desired end.

DISTRIBUTING BOARD.

Frank B. Cook, Chicago, Ill., patents (No. 816,847; dated April 3, 1906; filed February 2, 1903; serial No. 141,459) an iron frame distributing board.

The principal object of this invention s to provide a board at which the line and swithboard wires may be readily connected and disconnected.

Referring to the accompanying illustrations bars designated by the letter a are horizontally extending arms attached to any



suitable framework. To their forward ends are attached vertical strips a^1 upon which may be mounted any suitable protection devices. Terminal blocks B are removably fastened to the rear portions of the arms a and provided with a shank b^3 for attachment thereto. This shank carries a supporting ring b^4. A vertical strip of insulation b^1 is employed to hold the terminals b in position. The face of the block B is drilled on each side of the insulating strip with a double row of holes to receive the conductors.

The inventor claims that with this construction and arrangement of the blocks B the work of connecting and disconnecting lines is greatly facilitated.

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LOW MAINTENANCE
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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—100 second hand bridging telephones in good condition at three ($3) dollars each. Address Millersburg, Wooster and Orrville Telephone Company, Millersburg, Ohio. 615

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For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Position as wire chief or inside troubleman of a central energy exchange. Have had eight years' experience and can furnish the best of references. Address Box 614, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 614

YOUNG MAN possessing experience and ability desires position as manager with a progressive company. Would be willing to consider a proposal offering part interest in return for services. Address Box 612, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 612

WANTED—Young man with some technical training and experience with Stromberg Carlson central energy switchboard as switchboard man. Address, stating salary wanted and references, Box 617, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 617

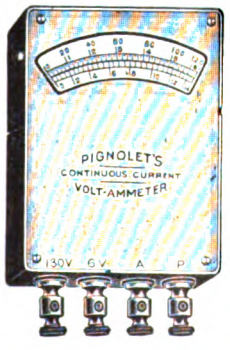
THE FOUNDATION of our business lies in the fact that we are successful in placing men speedily and satisfactorily. Our trained experts know just which men to select for each particular position. Investigate to-day the advantages and facilities we offer. Hapgoods, suite 511, 309 Broadway, New York City. 464

POSITION wanted with a manufacturing company in the advertising or sales departments, by a young man with energy, experience and ability. No reasonable offer refused provided there is opportunity for advancement. Address Box 613, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 613

WANTED—Several young men to plan telephone toll line and cable construction. Preference will be given to men with good electrical educations. The work is located in the western part of Pennsylvania. Necessary expenses paid when out of town. No applications considered unless age and salary expected are stated. Address Box 618, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 618

WANTED—Position as manager in exchange of 1,000 subscribers or less. Have had five years' experience in telephone business and am graduate of International Correspondence Schools. Best of references. Address Box 597, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 597

THE VALUE OF A MEASURING INSTRUMENT



Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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IN THE MANUFACTURING FIELD

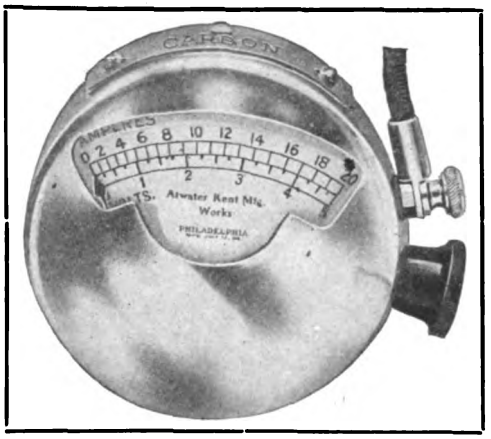
"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

AN INGENIOUS BATTERY TESTING METER.

THE Atwater Kent Manufacturing Works, of Philadelphia, Pa., manufacturers of pocket volt-ammeters, voltmeters and amperemeters, has recently put on the market a new meter called the Atwater Kent "DriSel" Tester, which is having a large sale. This meter is designed as a convenient instrument for making quick and accurate readings on dry cells. As shown in the cut, no leads are necessary, the back of the instrument being placed on the zinc terminal and any part of the side of the instrument on the carbon terminal.

This instrument is made up either as a voltmeter, reading from 0 to 3 volts or as an ampere meter, reading from 0 to 30 amperes. Each one is finished in the finest manner and furnished with a handsome leather case.

The regular meters made by this company, known as the "Kent Pocket Meters," are increasing in demand each year and there are now said to be some twenty thousand in constant use. These instruments are all calibrated by hand to standardized apparatus, made by skilled workmen, have a "Dead-Beat" needle giving a quick and accurate reading, and every instrument is fully guaranteed. As shown in the cut, the Automatic Volt-Ammeter has but one lead and no change is made in the connection to the battery for the two readings, as that in amperes is obtained by simply pressing the button.



Automatic Volt-Ammeter Made by the Atwater Kent Manufacturing Works.

The voltmeters and amperemeters are the same in size and appearance as the automatic volt-ammeter, but without the button attachment. A hand-sewed leather case is furnished with each instrument. The instruments of this company are sold at an extremely low price. Further information may be obtained on application to the company.

THE SWEDISH-AMERICAN TELEPHONE CO., Chicago, Ill., has recently received orders for their complete equipment from the following telephone companies; Farmers' Mutual Telephone Co., White Pigeon, Mich.; Osceola Telephone Co., Osceola, Mich.; Perry Mutual Telephone Co., Perry, Okla.; King City Telephone Co., King City, Mo.; Cuba Mutual Telephone Co., Mayfield, Ky.; Bascom Telephone Co., Bascom, Ohio; Forest Green Telephone Co., Forest Green, Mo.; Moore & Liberty Telephone Co., Enderlin, N. D.; Farmers' Union Telephone Co., Letcher, S. D.

Meter for Testing Dry Batteries Made by the Atwater Kent Mfg. Works.

THE F. BISSELL COMPANY, of Toledo, O., manufacturers of the line of construction specialties which is so well known, recently held its annual meeting, electing the following officers: President Frederick Bissell; vice-president, James Hodge; secretary, C. M. Hamilton; treasurer, L. N. Bardoll. Messrs. Hamilton and Bardoll purchased the interest held by Charles A. Peckham, who was the former secretary and treasurer of the concern.

THE DEAN ELECTRIC COMPANY, of Elyria, Ohio, has recently received orders for a number of common battery switchboards, amongst which may be mentioned the Farmers Mutual Independent Telephone Company, Everett, Washington, one multiple switchboard, 3,000 line multiple, equipped for 960 local and thirty rural lines. This exchange is to be equipped with the Dean harmonic system. The contract also calls for one multiple toll section, and a complete power plant with a harmonic converter. The Niagara County Home Telephone Company has ordered for its exchange at Tonawanda, N. Y., one multiple switchboard of 3,000 line ultimate, with 800 local and thirty rural lines equipped. This switchboard will be equipped for the Dean full selective party line system with duplicate harmonic converters.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., reports that recently magneto switchboard shipments have been made to Belmont, N. Y.; Geneseo, N. Y.; Farmersville, N. Y.; Little Valley, N. Y.; Caywood, N. Y.; Lodi, N. Y.; Interlaken, N. Y.; Ithaca, N. Y.; Attica, N. Y.; Russell, Pa.; Freeville, N. Y.; Akron, N. Y.; Springville, N. Y.; Coudersport, Pa.; Charlotte, N. Y.; Williamsville, N. Y.; Stafford, N. Y.; Truxton, N. Y., and Sugar Grove, Pa.

THE FRENCH BATTERY COMPANY, Madison, Wis., reports that its "Fleur de Lis" dry batteries have met with an exceptionally gratifying reception during the short time they have been on the American market. The company has recently moved its factory from Chicago, although it still maintains an office and salesroom at 69 Wells street.

THE LEEDS AND NORTHRUP COMPANY, 4901 Stenton avenue, Philadelphia, Pa., desires to call attention to a new medium price galvanometer which it is manufacturing. This instrument will be found of great value in testing long lines and is so designed as to give very accurate results. It is simple in construction, quick working, has strong suspensions that allow no zero shift, and a sensibility that is adequate for all ordinary measurement purposes and many that require a high degree of precision. With an instrument of this type location of trouble can be quickly determined and thus a great deal of time and money may be saved in the maintenance of a plant. The instrument in question is listed as a D'Arsonval Galvanometer Type P and all inquiries should include mention of this type to secure a full and detailed description.

THE S. H. COUCH CO., INC., Boston, Mass., has issued bulletin number fourteen descriptive of exchange telephone apparatus, construction material and accessories. The first pages are devoted to instrument wiring diagrams and descriptions. Signaling apparatus comes next and this is followed by illustrated descriptions of five distinct types of wall instruments for local and common battery service. On the latter pages will be found illustrated descriptions of the various parts used in the Couch telephones together with a brief description of the Style

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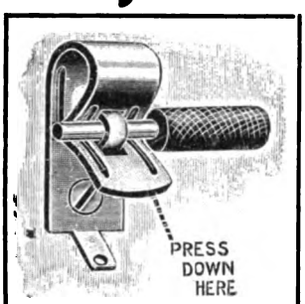
Every Wire Connection



No. 5—Spring Binding Post.

in the exchange, or at the subscriber's station is better made with

Fahnestook Spring Binding Posts

than in any other way.

Our **NO. 5 POST** illustrated this week is fitted with a lug to which the wire is soldered. This post will take receiver cord tips or wire of equal or smaller size. It is used also for operators' transmitter cord tips, for attaching battery and ringing leads to the switchboard, and many other purposes. We will make special posts from your suggestions. Write us. The Fahnestock is the standard binding post for batteries. Write for sample and prices.

Fahnestock Electric Company

129 Patchen Avenue, Brooklyn, N. Y.

Mr. MANAGER,

? IS YOUR Exchange Growing

Is your Office Accounting and Filing System adapted to expand with your growth?

If not, we can furnish you one that will! Write for descriptive booklet.

Our Special Copyrighted Forms will save you money!

Loose Leaf Lease Records, Bound Books, Special Ruled and Printed Forms, Card Systems, Filing Cabinets, etc., etc.

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Telephone Systems Department

THE Edwards-Hine Co.

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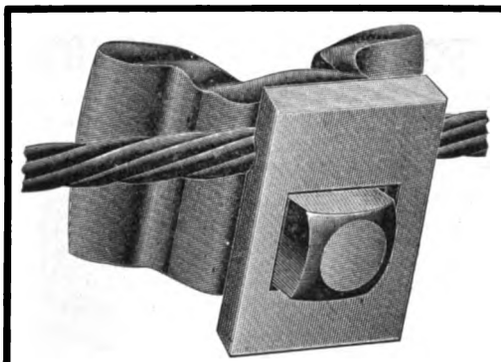
Mention American Telephone Journal.



THE *Little Giant*

Cable Hanger

Great in strength. Low in price. Made from forged steel not cast. It is listed in our catalogue, together with other good specialties. Let us send it to you.

THE NORTON TOOL CO. *Electric-I Department*

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Insure Your Poles and Crossarms Against Rot and Premature Decay

by applying to same **AVENARIUS CARBOLINEUM WOOD PRESERVATIVE,** tested by the only admissible evidence—30 years' use in any part and climate of the globe.

Standard Wood Preserver of New York Central Lines, American Telephone and Telegraph Company and other large Corporations.

Guaranteed to double the life of poles with proper application. Comes ready for use, anyone may apply it with a brush or by dipping; no skill nor machinery required.

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CARBOLINEUM WOOD PRESERVING CO.

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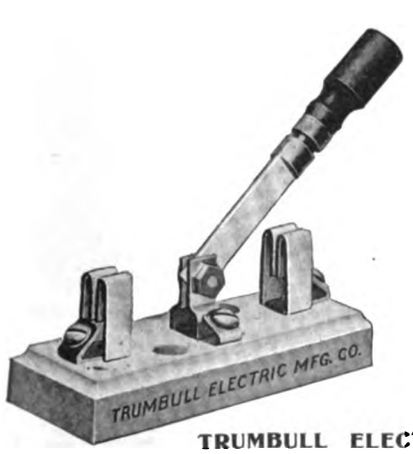
Beware of substitutes offered under similar names for easily discernible reasons.



CALL A SWITCH A SWITCH, but if you need the best say "TRUMBULL."

Sold on merit because they have distinctive marks of superiority.

Do you equip your rural lines with switches for protection against lightning? Let us tell you why you should use no other switch for this purpose.

TRUMBULL ELECTRIC MFG. CO.

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39 intercommunicating telephone adapted for trunk line service. Tools, construction material and pay station apparatus complete this very comprehensive booklet which will be mailed to all parties interested upon request.

USES OF WIRE CONNECTORS.

FOR many special purposes in line building the use of a readily removable wire connector affords a means of securing a proper method of construction, both from an economical and practical standpoint. In Fig. 1 is illustrated the H. W. W. wire connector. This is a standard type containing wire grooves which are made with different depths for use with wires of different size. It clamps the wires between opposite grooved plates, which are released for the insertion of the wire, and brought together and clamped by the action of a single bolt and nut. Figs. 2 and 3 illustrate the use of the connector for attaching drop wires, such as the drop wire for a party line subscriber, to a continuous main wire. The connector can be very quickly slipped over the main wire and clamped to it. This particular piece of apparatus by an ingenious arrangement of its parts makes it possible to use smaller wires for the drops than for the main circuit, and to make substantial test joints between line wires and insulated bridle wires connected to cable conductors. Fig. 4 shows two methods of connecting wire ends upon a double grooved insulator.

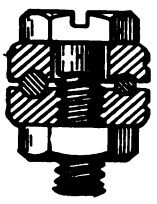

Fig. 1. Construction of H. W. W. wire connector.

This connector has also been extensively used for test joints in toll lines at intervals of five miles or less. In Fig. 6 is shown the method of arranging test connections at a transposition pole. The Chicago Brass Company, 211 and 213 Lake street, Chicago, Ill., is the general sales agent for the H. W. W. wire connector illustrated in connection with this article, and this firm is able to give further information concerning the advantages and economies to be effected by the use of this low priced device.

THE ELECTRIC CABLE COMPANY, of 17 Battery place, New York, has just received large orders for Voltax, the new insulating compound from the American Railways Company, of Philadelphia; S. Pearson & Son, contractors on the Pennsylvania tunnel, and from the United Water Improvement Company of Philadelphia. Reports show that this material has been used successfully both as an insulating compound and as a waterproofing. The company reports the sale of this compound in large quantities to fifty leading railway companies in this country and in England, France, Germany and Italy.

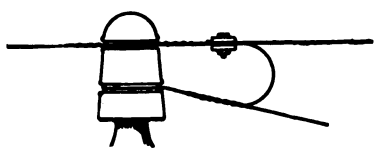

Fig. 2. Method of attaching drop wire to main line.

FRANK B. COOK, Chicago, Ill., has issued a new catalogue which describes his cable terminals. Nine different types are illustrated, each being accompanied with a price list for sizes varying from five to 100 pairs. In connection with these terminals several novel improvements have been made. The fuses are clamped in place by a simple spring device instead of with nuts and screws. The covers are equipped with spring locks which automatically hold them in place when raised for inspection. Terminals which are for use without pot-heads and all junction boxes are equipped with self-soldering nozzles. This catalogue will be found of particular value to parties interested in cable distribution and can be secured free of cost by addressing the company.

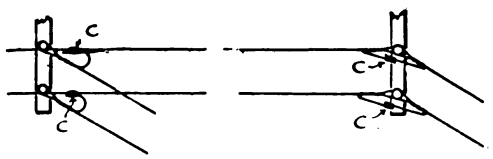

Fig. 3. Test connectors used for taking off loop to subscriber and for carrying line through when wires from both directions are dead ended at corner pole.

THE ELECTRIC GOODS MFG. CO., Boston, Mass., in a mailing card which it is sending to the trade shows the economical value of a private hotel system. This company makes a specialty of telephone equipments for hotels, factories, offices and private houses. Full particulars of instruments and systems to meet any service requirements can be secured by addressing the company.

THE COLUMBIA ELECTRIC COMPANY, McCordsville, Ind., is manufacturing a telephone known as the Columbia Special, to which it wishes to draw attention. This instrument is designed for heavy service conditions where there are a number of parties on one line. The generator is wound for a large output so that it will ring on a line carrying many parties. All the contacts are of pure platinum, and the best silk magnet wire is used for ringers, generators, and induction coils. The talking and listening equipment is said to be excellent, it being possible to transmit the tick of a watch over forty miles of line. The company will be pleased to quote prices and will furnish particulars upon request.

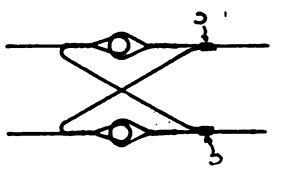

Fig. 5. Test connections at transposition pole.

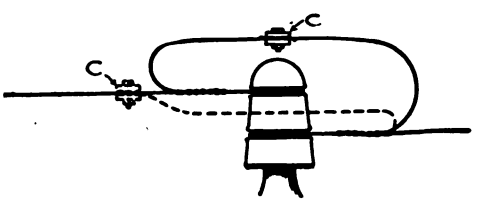

Fig. 4. Method of carrying through line connection on double grooved insulator.

THE FISK-NEWHALL TELEPHONE MANUFACTURING COMPANY, Chicago, Ill., has compiled catalogue No. 4, in which is described a large variety of apparatus. Net prices of each article are given, so that in making up estimates no delay need occur, due to lack of information upon costs. This firm manufactures a steel drop frame which can be built of any size so as to be easily adapted to any make of switchboard in which it is desired to replace old style drops by those of a more efficient type. Amongst other things shown are a new type of distributing frame, a new fuse, enclosed in a glass tube, and the Fi-Ne coil and generator winders. This catalogue can be obtained free of cost by application to the company.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., is distributing a folder which sets forth the advantages claimed for its switches. Briefly stated these are perfect contact secured by self-aligning contact clips; superior binding post attachment which insures solid and immovable contacts; and high grade mechanical construction. The switches are made in four styles, single and double contact, and single and double throw. Each type is illustrated and accompanied with list prices and discounts for standard packages or less. The folder contains information concerning the faults frequently present, but not readily detected, in knife switches which should be interesting and useful. These switches have a ready sale amongst telephone companies which use them on various circuits about the exchange, and on small rural line installations. A copy of the folder can be secured by addressing the company.

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CORDS : CABLES WIRES

We Manufacture

Cords for Telephones and Switchboards : : :
Cables and Wires for Switchboards : : :
Cables for Interior Purposes : : : : :

SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

"GREAT OAKS FROM LITTLE ACORNS GROW AND MINUTES INTO HOURS, YOU KNOW"

Are you getting paid for all the excess minutes your toll lines are in use?

The overtime charges on one call seem to you not worth bothering about. But if you note for one month the number of times your lines are used and the approximate excess minutes and fractions over your time limit, you will be surprised at the loss.

Now multiply this lost amount by twelve months and the result is astonishing.

We want this next statement to sink deeply into your mind. Think over it, sleep over it and remember it every time your toll operator makes a connection:

"A Calculagraph will save every minute of lost time and the saving in three months will more than pay for it!!"

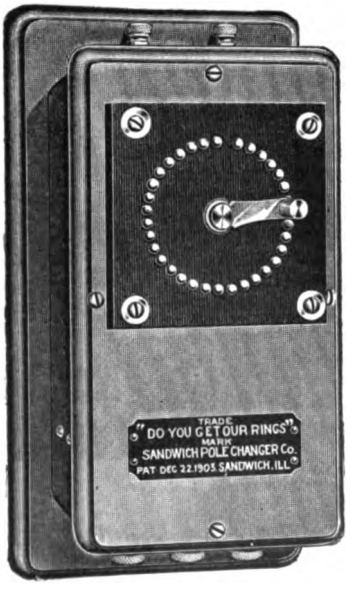
It Makes No Clerical Errors
Write for Booklet

The CALCULAGRAPH CO.

1437 Jewelers Building, NEW YORK CITY

TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company

400 Eddy Street, Sandwich, Ills.

IDEAL FACTORY SERVICE

can only be given with an intercommunicating system. Its value is increased 100 per cent. when any station can be connected to the exchange.

The Couch automatic system with auxiliary trunk buttons is the type of equipment you need.

Let us send you further information.

Trunk Button

Send for Catalogues

STANDARD SIZES:

6	intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

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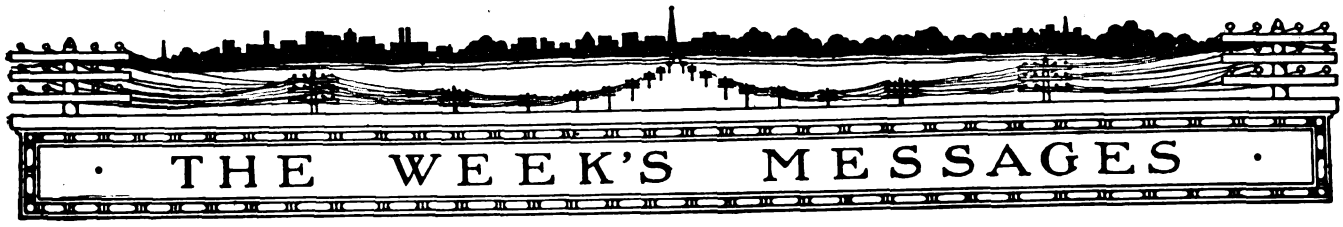

NEW COMPANIES.

CYCLONE, IND.—The Cyclone Co-operative Telephone Company, of Cyclone, Clinton Co., Ind., has been incorporated with a capital stock of $500. The stockholders are Albert Strong, W. D. Bolt, W. G. Irons, W. S. Emley, Jas. McIntire, J. B. Derrick, J. W. Bartlett, Edward Spray and others.

EVANSVILLE, IND.—The A. & G. Telephone Company, Evansville, has been incorporated with a capital stock of $5,000. The incorporators are Cornelius Roeder, Christ. L. Goeble and Louis A. Haas. The company will operate telephone systems in Vanderburgh, Posey and Gibson counties.

NEW PARIS, IND.—The New Paris Independent Telephone Company, New Paris, Ind., has been organized with a capital stock of $20,000. The officers are: President, S. C. Richie; secretary, W. D. Rush; treasurer, A. C. Lindemuth. The company will have connections as far south as Eaton and as far east as Eldorado.

PRESTON, IA.—The Preston Telephone Company has been organized, and has completed arrangements whereby it will acquire the Jackson Telephone Company, of Preston.

SIDNEY, IA.—A municipal telephone system is to be installed in Sidney. G. Munsell will be in charge.

LOVELL, ME.—The West Lovell Telephone Company, of Lovell, has been incorporated with a capital stock of $1,000. President, W. S. Fox; treasurer, G. W. Andrews, both of Lovell.

ALANSON, MICH.—The Buckeye Telephone Company has been incorporated with the following incorporators: Calvin S. Dice, J. C. Bowman and Gilbert L. Hicks. The company will build lines east and west of Alanson.

GARY, MINN.—The Gary Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are Halvor Lee, D. C. Jones, Gregor Moe, N. J. Nereson, Anton Lanon, Trom Rishof and Andrew Engeset. The following officers have been elected: Ole H. Sersland, president; Andrew K. Rude, vice-president; Halvor Lee, secretary, and N. J. Nereson, treasurer.

HALLOCK, MINN.—The Kittson Telephone Company, formerly the Hallock Telephone Company, has been incorporated with the following officers: John Birkholtz, president; R. A. Demars, vice-president; T. M. George, secretary and treasurer. The company will build lines to Mattson, Lancaster and Bronson.

NEW RICHLAND, MINN.—The New Richland Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are Milo A. Hodgkins, H. E. Johnson, F. J. Wagner, C. W. Brown and C. B. Johnson.

ST. CLAIR, MINN.—The Independent Telephone Company, of St. Clair, has been organized with the following officers: President, Henry Theilman; secretary, Chas. O'Connor; treasurer, J. W. Chase; directors, P. H. Bowe and William Boswell.

SUMRALL, MISS.—The Sumrall Telephone & Telegraph Company, of Sumrall, Miss., has been incorporated with a capital stock of $5,000. The incorporators are J. R. Anderson, John Nutt, B. R. Campbell.

OSMOND, NEB.—The Southwestern Telephone Company, Osmond, Pierce County, Neb., has been incorporated with a capital stock of $320.

CLAYTON, N. M.—The Kenton Telephone Company, with headquarters at Clayton, Union County, N. M., has been incorporated with a capital stock of $2,500. The company will build telephone lines in Union County, N. M.; Baca County, Colo., and Beaver County, Okla. The incorporators and directors are: Henry Bearly, J. J. Ballard, John W. Turner, A. W. Hanner, R. F. Drew and D. K. Lord, all of Kenton, Okla.

BOUGHTONVILLE, O.—The Boughtonville Telephone Company, Boughtonville, O., has been incorporated with a capital stock of $10,000. The incorporators are: W. G. Blackmore, J. O. Palm, F. E. Hale, Willard Howard, S. E. Gleason, E. A. Van Buskirk.

MINERVA, O.—The Minerva Telephone Company, Minerva, Stark County, O., has been incorporated with a capital stock of $4,000. Incorporators are E. D. Shaw, R. T. Davis, A. A. Bates, C. G. Hursh, B. C. McCauley and W. E. Russell.

TORONTO, O.—The Republic Telephone Company has been incorporated with a capital stock of $25,000 to operate lines in Toronto, Empire and New Cumberland. The incorporators are J. G. Gilchrist, R. Gilson, W. C. Jones, Lee O. Smith and J. T. Campbell.

CLINTON, OKLA.—The Clinton Mutual Telephone Company, with principal offices at Clinton, Okla., has been incorporated with a capital stock of $1,000. The directors are: F. G. Cope, J. D. Kiletrell and F. A. Wadleigh, all of Clinton.

HENNESSEY, OKLA.—The College Corner Rural Telephone Company, Hennessey, Okla., has been incorporated with the following incorporators: Robert L. Sutton, George Gray and others.

HENNESSEY, OKLA.—The Myrtle Rural Telephone Company has been incorporated. J. R. Fowler, W. D. Frakes and others are incorporators.

SAYRE, OKLA.—The Modern Telephone Company, with headquarters at Sayre, Okla., has been incorporated with a capital stock of $10,000. Directors are: D. E. Grubs, O. J. Ivester, L. P. Jones and Robert Rice, of Sayre, and T. S. Wilson, of Prentiss, Okla.

FREEWATER, OREGON.—The Tumalum Mutual Telephone Company has been organized at Freewater, Oregon, with F. J. Bodefelt as president. The company will build a line between Freewater and Walla Walla.

ENTERLINE, PA.—The Enterline-Halifax Telephone Company has been organized at Enterline. The company will commence the construction of its lines at once.

MT. PLEASANT, PA.—The Farmers' Telephone Company, of Mt. Pleasant, has been organized with a capital stock of $3,000. The company is to build a line to Donegal.

VETERA, PA.—The Nicktown & Ebensburg Telephone Company, of Vetera, Cambria Co., Pa., has been incorporated with a capital stock of $5,000. Nathaniel Good, of Nicktown, is among the incorporators.

BRITTON, S. D.—The Marshall County Telephone Company, Britton, S. D., is to be incorporated with a capital stock of $100,000.

HITCHCOCK, S. D.—The Westside Telephone Company, of Hitchcock, has been incorporated with a capital stock of $5,000. The incorporators are: B. W. Lamphier, W. P. Price and Frank Gilley, of Hitchcock.

GORDON, TEXAS.—The Mt. Zion & Lost Creek Telephone Company, of Gordon, Palo Pinto County, Texas, has been incorporated with a capital stock of $1,000. The incorporators are W. H. Rix, R. M. Vaughn and W. J. Pierce.

DALLAS, WIS.—An Independent Telephone Company has been formed at Dallas. The company will operate lines in East and West Dallas and Maple Grove. The officers of the company are: Ben Massie, president; Frank Garner, secretary; John Hanson, treasurer; J. S. Hegtwet, director.

DARLINGTON, WIS.—The Lovett's Branch Telephone Company has been organzed with E. G. Nall as president. The company will build a line from Darlington to Wiota.

STRATFORD, WIS.—The Stratford Telephone Company, Stratford, Wis., has been incorporated with a capital stock of $1,500. Incorporators, R. Connor and others.

UNION GROVE, WIS.—The Union Grove Telephone Company, Union Grove, has been incorporated with a capital stock of $5,000. John S. Blakey, president, and William Callander, secretary.

OTTAWA, CAN.—The Telegraph Company, which is to operate the telegraph and telephone lines of the Grand Trunk Pacific, has been incorporated with a capital stock of $10,000,000. The incorporators are President Hays, Frank W. Morse, Wm. Wainwright, W. H. Biggar and D'Arcy Wainwright of the Grand Trunk Pacific directorate.

SNOWFLAKE, MAN., CAN.—An Independent Telephone Company has been organized at Snowflake with the following officers: Wallace Brown, president; R. T. Robertson, secretary and treasurer; construction committee, Adam Maxwell, John Fallis, R. T. Robertson and James Drew.

ST. CATHARINES, ONT., CAN.—A new Independent telephone company, to be known as the Niagara District Independent Telephone Company, has been organized at St. Catharines to compete with the Bell Company. Alfred Hoover, of Markham, is interested in the organization.

WELLAND COUNTY, ONT., CAN.—The Welland County Telephone Company has been incorporated with a capital stock of $40,000, to construct and operate a telephone system in Welland County. The directors are C. Glenny, S. H. Tripp, W. Robinson, all of Welland County, Ont.

FRANCHISES.

FOUNTAIN, MINN.—John S. Solis has been granted a twenty year franchise for a telephone system in Fountain, and will establish an exchange there.

GLENVILLE, MINN.—The Tri-State Telephone Company has been granted a franchise at Glenville.

NORTHFIELD, MINN.—C. E. Church has applied for a telephone franchise in Northfield.

WEST LEIPSIC, O.—The Farmers Mutual Telephone Company has been granted a telephone franchise at West Leipsic.

FORT SILL, OKLA.—The Wichita Mountain and Orient Railway Company has been granted permission to construct and maintain a telephone and telegraph system through the Fort Sill military reservation.

FINANCIAL.

PRINCETON, ILL.—The Bureau County Independent Telephone Company has declared a semi-annual dividend of 4 per cent.

SLEEPY EYE, MINN.—The Sleepy Eye Rural Telephone Company has declared a dividend of 6 per cent.

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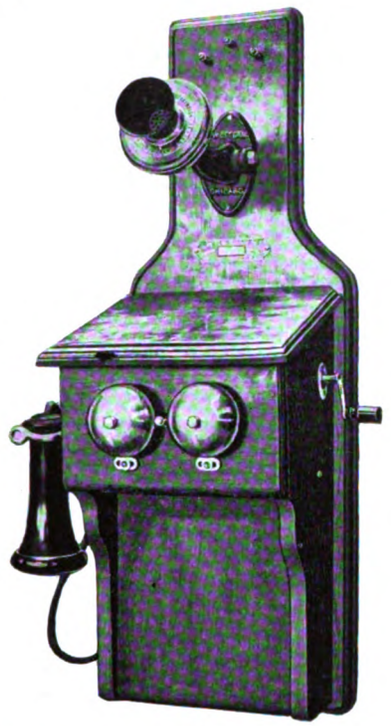


Bridging Telephone.—Type M.
This style of cabinet also made into:
3-Bar, Series, Type "K"
4-Bar, Bridging, Type "L"
with any ringer resistance desired.

Western Pioneer Telephone

Five-Bar Bridging

Our **New Western Pioneer** telephone can be furnished for all classes of special service such as **ring through, non-interfering, divided circuit, central checking party line** and in fact can be used where any generator call telephone is now being used. The apparatus used in this instrument is of **New Western design.**

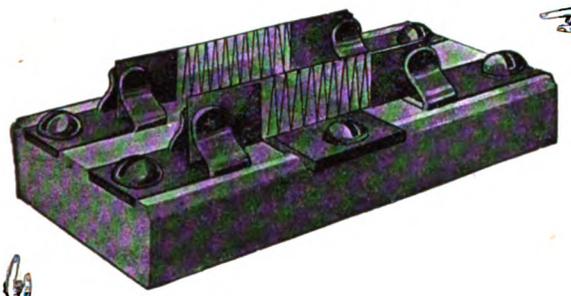
The **common battery type** of **magneto telephone** is becoming popular. The cabinet is compact and neat in appearance, all parts are **conveniently mounted,** the wiring is simple and the cabinet will accommodate a **three, four or five-bar generator.** We manufacture all of the parts used in this instrument. When the upper compartment is open the generator, ringer, hook switch, induction coil and receiver binding posts are exposed. When the battery box is removed by sliding downward, the batteries and battery connections are exposed.

WRITE FOR OUR GREEN BOOKLET

WESTERN TELEPHONE MFG. CO.

"The Pioneer Independent Telephone Factory"
Established 1893

58 W. Jackson Boulevard, Chicago



TWICE AS GOOD, COST NO MORE

than the ordinary kind--only one of the many protective devices we make for the critical trade.

These blocks are smaller, neater and better constructed in every way than blocks of other manufacturers for the same purpose. The springs are made of German silver, instead of brass or copper. They cost us more and are better as they do not lose their elasticity. The fuse is of our own special design and patent, giving many times the length over other styles. By wrapping this fuse around the mica we not only secure a "choke coil" effect, acting as an impedence to the passage of the lightning, but heat the wire more rapidly at the angles. By this method we bring the fuse wire within 1-32 of an inch from the ground plate, and give at least eight discharge points to ground. We do not use ordinary soft, easily broken composition fuse wire, but a special hard wire which will stand considerable rough handling, and is of the proper size and conductivity. By the use of this type of fuse and the ground plate there is no necessity for the purchase of blocks with carbons, although, we make and can furnish them if so desired.

A customer wrote us, Jan. 9th, 1906: "Please express at once 500 of your No. 1 patent wrapped fuses. We have purchased about 2,500 of your fuse blocks and will want 500 more. They have met every requirement intended for their use." (Letter on file.)

Free sample on request of an operating company. Write to-day.

Central Telephone & Electric Co.

MAKERS HIGH GRADE TELEPHONE APPARATUS
DEALERS TELEPHONE SUPPLIES (Exclusively)
2131-37 LUCAS AVENUE ST. LOUIS

WE WANT TO SEE YOU
ROOM No. 650
National Telephone Convention
AUDITORIUM HOTEL CHICAGO
JUNE 26-28, 1906

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THE WEEK'S MESSAGES

CLINTON, MO.—The Mutual Telephone Company, of Clinton, contemplates increasing its capital stock from $15,000 to $100,000. The money will be used to extend the company's system.

ULYSSES, NEB.—The Ulysses Independent Telephone Company has declared a dividend of 12 per cent. for the year.

BELOIT, WIS.—The Beloit Telephone Company has declared a 5 per cent. dividend on its capital stock.

KILBOURN, WIS.—The Farmers' Inter-County Mutual Telephone Company has increased its capital stock from $5,000 to $10,000.

COMBINATIONS.

WINCHESTER, IND.—The Winchester Telephone Company, Winchester, Ind., has been acquired by the Eastern Indiana Telephone Company.

READFIELD, MAINE.—The Crosby Telephone Company, Readfield, has been acquired by the Maine Telephone Company.

CHATHAM, N. Y.—It is quite probable that the Home Telephone Company of Albany will soon acquire possession of the property of the Chatham Co-operative Telephone Company.

ELYRIA, O.—The Rawson Company, of Elyria, has purchased the controlling interest in the Oberlin Telephone Company. The Rawson Company is to entirely reconstruct the system.

ELECTIONS.

MACOMB, ILL.—The Macomb & Western Illinois Telephone Company, Macomb, has elected the following officers: President, C. M. Erwin; vice-president, George Kerman; secretary, E. Y. McLean; treasurer, C. V. Chandler.

OAKLAND, ILL.—The Embarrass Tel. & Tel. Company has elected the following officers: E. N. Blair, president; John H. Henn, vice-president; J. D. Noel, secretary; George Kirkpatrick, treasurer.

PRINCETON, ILL.—The Bureau County Independent Telephone Company has elected the following officers: Dr. E. A. Owen, president; C. O. White, general manager and secretary; S. S. Harris, assistant secretary.

ULYSSES, NEB.—The Ulysses Independent Telephone Company has elected the following officers: President, W. H. H. Starbuck; vice-president, D. A. Wynegar; secretary, G. E. Crosby; treasurer, George Dobson.

LEBANON, N. J.—The Lebanon Telephone Company has elected the following officers: President, S. J. Shurts; vice-president, George Clark; secretary, A. O. Farley; treasurer, E. W. Sutton; directors, J. C. Farley, H. H. Miller, J. E. Ramsey.

AMSTERDAM, N. Y.—The Automatic Telephone Company has elected the following directors: W. Wendell, J. K. Stewart, A. W. Breedon, D. Ostrom, W. B. Charles, J. T. Sudgen, A. R. Conover, L. E. Harrower, B. Fisher, S. Wallin and Geo. McClumpha.

COHOES, N. Y.—The Cohoes & Waterford Home Telephone Company has elected the following directors: Jas. H. Shine, John Clute, Fred. W. Kavanaugh, Thos. Breslin, George H. Fitts, P. H. Andrae, I. M. Brush, Howard Hendrickson.

PERSONAL.

HORTON S. ALLEN has been appointed superintendent of the district of the New England Telephone and Telegraph Company, covering the exchanges of Brighton, Newton, Waltham, Needham, Wellesley and Concord, with headquarters at West Newton, Mass.

D. G. RALEY has been appointed superintendent of the northern division of the Columbiana County Telephone Company, of Salem, O.

CHARLES E. TEUSH, formerly in charge of construction in the Evansville district of the Cumberland Telephone and Telegraph Company, has been appointed general superintendent of construction with headquarters at Nashville.

FRANK TRUHLER has been appointed manager at Hudson, Wis., by the Northwestern Telephone Exchange Company.

A. WALKER, of Iowa Falls, has accepted the position of manager of the Mutual Telephone Company of Des Moines.

KENDALL WEISIGER, who has for the past four and a half years held a responsible position in the engineering department of the Southern Bell Telephone and Telegraph Company, has recently been promoted to a position in the general manager's office. He will have charge of the company's traffic in the seven States in which it operates.

MISCELLANEOUS.

INDIANAPOLIS, IND.—Arrangements have been made by H. S. New, president of the Indianapolis Telephone Company, and Theodore Thorward, president of the South Bend Home Telephone Company to construct a through metallic copper toll line between this city and South Bend. Heretofore the toll business has been transacted through Logansport, but the number of calls has so increased that connections are not established as rapidly as patrons desire. Messages from this city are transferred to the northern part of Indiana and through Michigan by the South Bend exchange.

EDMONTON, ALBERTA, CANADA.—$25,000 has been provided for the preliminary work on the establishment of a government owned telephone service in the province. The government intends establishing long distance lines through the province of Alberta.

New Construction in the Field

GLOBE, ARIZ.—The exchange of the Globe Telephone Company is to be entirely reconstructed, and many improvements made to the system.

MURILLO, ARK.—The Cotton & Reves Telephone Company, of Murillo, Ark., is to build a number of rural lines.

BELVIDERE, ILL.—The Belvidere Telephone Company, Belvidere, Ill., is to rebuild its lines, and put in an entirely new and modern system. The company expects to expend about $25,000 in making these improvements

MACOMB, ILL.—The Macomb & Western Illinois Telephone Company is to build a long distance line from Macomb to Quincy, also one to Keokuk, Ia., by way of Bowen, and one to Peoria.

ODELL, ILL.—The Odell Telephone Company is constructing a new country line.

COLUMBUS JUNCTION, IA.—The Columbus Junction Telephone Company is making many improvements and extensions to its system.

INWOOD, IA.—The Hawarden Telephone Company, of Hawarden, will build a line through Inwood.

SCHLESWIG, IA.—The Schleswig Telephone Company is making many improvements in its system.

TRAER, IA.—The Mutual Telephone Company is building a line to Buckingham.

GAINESBORO, KY.—The Gainesboro Telephone Company is to double the capacity of its switchboard, and will also put up 4,000 feet of cable in Glasgow.

GRAND BLANC, MICH.—The Grand Blanc & Mundy Telephone Company is building a number of new lines.

GRANITE FALLS, MINN.—The Granite Falls Telephone Company is to build several rural lines.

NORWOOD, MINN.—The Norwood Young America Telephone Company is to install a line through Camden.

OKOLONA, MISS.—The Givhan Telephone Company is constructing a line from Okolona to Amory and Aberdeen.

MACON, MO.—The Macon Telephone Company has commenced the reconstruction of its plant. The company contemplates many improvements in its system, including the installation of a new switchboard.

ESKALAKA, MONT.—The Eskalaka Telephone Company is to expend a considerable sum in completing its system.

THOMPSON, MONT.—The Independent System, owned by E. D. Peck, of Thompson, is being extended to Plains. A new exchange is also to be established at Thompson.

LEBANON, N. J.—The Lebanon Telephone Company is to extend its lines in many directions.

BATH, N. Y.—The Wayne circuit of the Bath, Hammondsport and Savona Telephone line is being extended to Weston.

CENTERVILLE, N. Y.—The Neversink River Telephone Company is preparing to install an exchange at Centerville and one at Hurleyville. The company will also build lines to Sheldrake and Woodburn.

COHOCTON, N. Y.—The Cohocton Valley Telephone Company is extending its lines.

HANNAH, N. D.—Messrs. Adams and McGrath, of Hannah, are building lines from Hannah to Sarles, thence from Daniels to Calvin.

LANSFORD, N. D.—H. Willis is installing a telephone system in Lansford.

BURTON, O.—The Burton Telephone Company, of Burton, is making improvements in its system.

CRESTLINE, O.—The Crestline Telephone Company is building a number of rural lines.

MARTINSBURG, O.—The Knox-Licking Telephone Company, with an exchange at Martinsburg, has commenced work on its Purity-Wilkins branch.

NEY, O.—The Ney Telephone Company is preparing to make extensions to its system.

OXFORD, O.—The Oxford Telephone Company is extending its lines along the Eastern Township line.

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OUR MOTTO—QUALITY AND PROMPT SHIPMENTS.

KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

We have recently published a little book giving some very valuable information about Cedar Poles. It contains Specifications, Inspection Comments, Shipping Data, Etc. "Yours for the asking."

KELLOGG SWITCHBOARD & SUPPLY COMPANY - - - CHICAGO, ILL.

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Manufacturers of

Double Arming Bolts and Washers

WE GALVANIZE BY THE HOT PROCESS

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POLES

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30 and 35 foot lengths for rural telephone lines a specialty.

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WHITE CEDAR POLES

Buy from the Producers and Save Jobbers' Profits.

PENDLETON & GILKEY - Minneapolis, Minn.

We Make a Specialty of Telephone Poles.

POLES

Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines

YARDS: Menominee, Mich. Escanaba, " Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.

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WHITE CEDAR POLES

Longest Lasting Best Grade

40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st

25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

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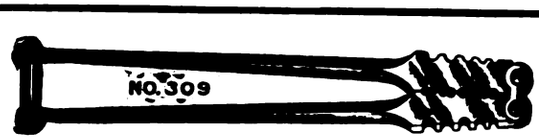

No. 309 Reversible Combination Wire and Sleeve Clamp.

Send a two-cent stamp for 48-page catalogue.

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EDISON
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Don't Shed Active Material
GENERAL STORAGE BATTERY CO., Gen. Offices, 45 B'way, N.Y. Works, Boonton, N.J.

Experts in Underground Conduit Subway Construction
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Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
Toll Tickets, Toll Station Journals, Toll Station Ledgers, Receipts for Toll Service, Monthly Check Reports, Coupon Books, Stock Certificates, Lease and Rental Records, Cash Books, Trouble Tickets, Rental Receipts, Voucher Checks, Exchange Directories, Fine Stationeries, Special Forms of All Kinds.
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STANDARD PORTABLE DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.
Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.
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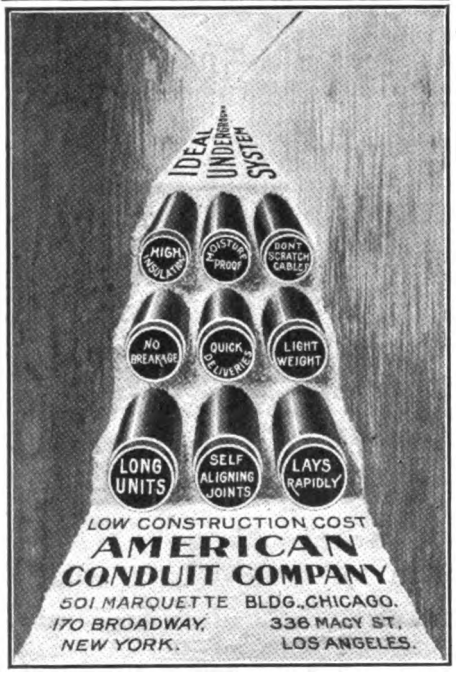

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TELEPHONE & TELEGRAPH WIRE
HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
—MADE IN THREE GRADES—
"EXTRA BEST BEST" (E.B.B.). "BEST, BEST" (B.B.). "STEEL"
INDIANA STEEL & WIRE CO. MUNCIE, INDIANA

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219 E. Van Buren St., Chicago
MANUFACTURERS OF
Specialties in Celluloid for Telephone Companies, Instruction Cards, Name Plates, Etc., for use on Transmitters or Coin Boxes
WRITE FOR SAMPLES

MUST BE RUBBED IN

Advertising, like liniment, doesn't do much good when applied with a feather. It needs to be rubbed in for results. Apply it through the right mediums to the right people at the right time, and keep on rubbing it in until returns begin to come. Then still keep on rubbing.—*Jed Scarboro, in Profitable Advertising.*

EVERY COIL
of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.
Don't accept Wire without the **Roebling Seal.**
JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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Eaco Steel Switchboard Cords

WE would like to send you samples of our Eaco Steel Cord, because it is made right and will overcome the difficulties so often found in cords. ¶Samples and quotations on request.

ELECTRIC APPLIANCE COMPANY

CHICAGO
SAN FRANCISCO

Telephone Manufacturers

DALLAS
NEW ORLEANS

THE GOULD PLATE

The large contact surface for the active material of the Gould plate is *developed out of the lead of the blank itself*—not by the removal of any metal but by our special process of "spinning" the surface of the lead blank into the numerous ribs.

We employ only chemically-pure lead, dense and uniform throughout.

The Gould plate retains its initial capacity longer than any other type. For telephone work it is unequalled. Complete estimates upon request.

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Lower Prices on Condensers

Here's a chance to save money on condensers and improve your service.

Iron Box Condenser
No. 300

Save in 2 ways.
Lower price on the condensers.
Less time used in installing them.

All the tools needed are:
1 screwdriver,
2 screws, and
3 minutes time.

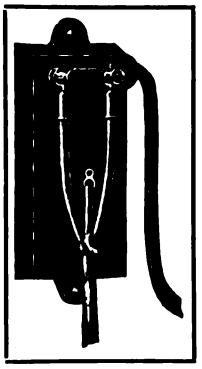
That's how these condensers shown in the cuts are put in, also our No. 186.

On party lines they are as essential to perfect service as the current itself.
No trouble from other receivers being off the hooks if you use a condenser.
You can talk just the same.
No one but the party you are speaking with can hear you.

Just to show you how they improve the service, we'll equip your line with our condensers *Free of Charge*. Use them 30 days. If they are all we claim send us the price, or, if you don't like them send them back—we'll pay the freight.

Better send for our new circular.
The prices in it are lower than in the old ones.

Iron Box Condenser
No. 301



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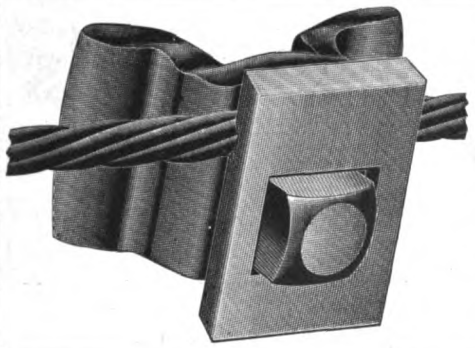

THE
Little Giant
Cable Hanger

Great in strength. Low in price. Made from forged steel not cast. It is listed in our catalogue, together with other good specialties. Let us send it to you.

THE NORTON TOOL CO. *Electrical Department*
WEST PARK, OHIO

TELEPHONY

offers to young men a career full of splendid possibilities. If you desire to fit yourself for a responsible and well-paid position, fill out this coupon to-day, requesting our 200-page handbook (FREE), describing our Telephone, Electrical, Mechanical Engineering Courses and over 60 others. This is **your** opportunity. Take advantage of it. Write NOW.

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Am. Tel. Jr., May 5, '06

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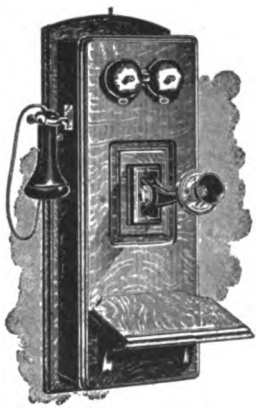
because of the little things in the business. There is little difference between one man and another, but that little counts for a great deal. It is the little things that count.

We have been making dry batteries for eighteen years and every year we have tried to make them a little bit better than the year before. In doing so we think we have helped to lessen telephone troubles, and helped the telephone business.

The "1900" dry battery is one of the little things that make for perfection. Try it.

The Nungesser Electric Battery Co.
CLEVELAND, OHIO

General Sales Office, 128 W. Jackson Boulevard
CHICAGO, ILL



1st
TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

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Our Price is Right **Harrison and Clinton Sts., Chicago**

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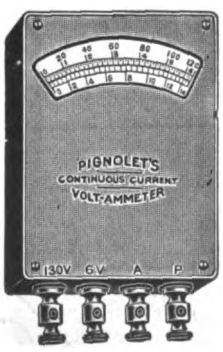

The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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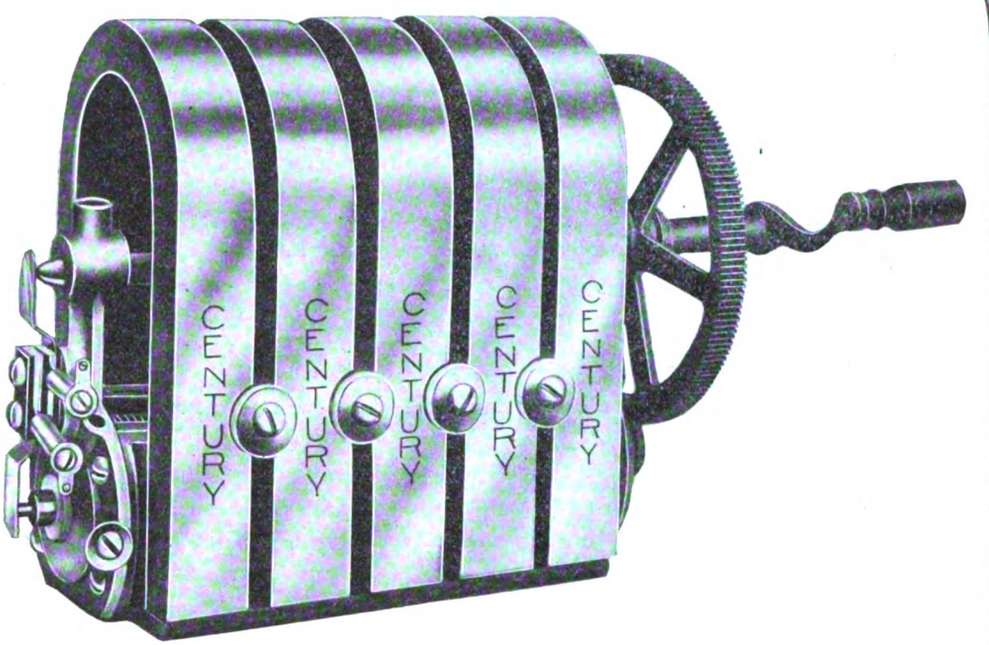
CENTURY

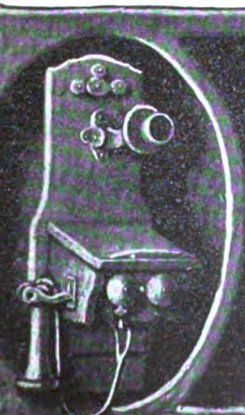
100 % GOOD

The reason why you can connect more

Century Telephones



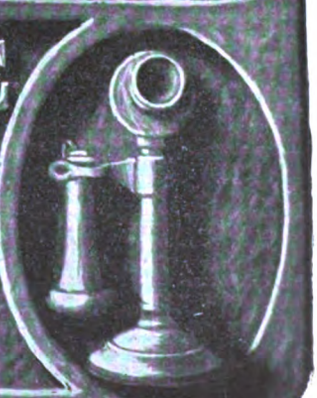
on a line, and still have more than sufficient ringing power, is because the "CENTURY TUNGSTEN" steel generators are equipped with magnets made of tungsten steel. This steel will retain about 30 per cent. more magnetism than any other, and consequently when used in generators increases their power just that much. The generator has other features just as good that we will be pleased to show you. LET US SEND YOU ONE. Our line of Magneto and Common Battery equipment is complete.



CENTURY TELEPHONE CONSTRUCTION CO.

332 ELLICOTT STREET

BUFFALO, N.Y.



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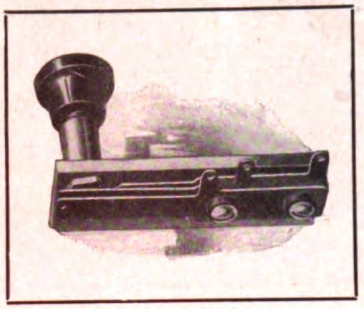
Little Things That Count



Simplicity is a noticeable feature of all MONARCH apparatus. The push button used in bridging telephones for code signalling, to ground the generator, to change the ringing current from alternating to pulsating, etc., is no exception. A mounting to go inside the cabinet, a bushing to pass through to the outside, a plunger with a hard rubber button and any arrangement of contact springs. That is all.

MONARCH TELEPHONE MFG. CO., - - CHICAGO, U. S. A.

Type SW Terminal. No pothead necessary. Equipped with carbons and tubular fuses.

COOK'S
POLE CABLE TERMINALS AND JUNCTION BOXES

FOR

Multiple Tap Cable Distribution

Cook's Terminals furnish the most approved forms of protection, and the best and simplest means of cable distribution.

Cook's Junction boxes are best for cable splicing. They can be used in conjunction with the terminals or alone. At points where you desire to dead-end your cable use Cook's Junction Box. You can add a cable Terminal later if you wish.

SELF SOLDERING NOZZLES
Are Furnished With Both Terminals and Boxes

WRITE FOR PLAN FOR YOUR CABLE LAY-OUT

Frank B. Cook

238 West Lake St., Chicago, Ill.

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word **"Roebling"** is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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DEAN TELEPHONE APPARATUS

WE wish to call your attention to a few practical points which may seem obvious, yet they are without question the most vital ones in the construction of a telephone. In fact reliability and facility of repair should be the very first in the list of imperative considerations.

A hook-switch with a removable lever which is normally securely locked in place by a spring catch. When it is removed it prevents breakage in handling and shipping.

A transmitter arm which can be removed without disturbing the transmitter wiring.

A very sensitive ringer made by the new Dean construction which absolutely prevents sticking.

A powerful generator which has stood the test of time.

A self-contained arrester with lock-nut line binding posts.

A tapper guard for protecting the ringer from injury.

Four (4) hinges with soldered connection spiral springs to carry wiring to the cabinet lid does away with loose cords.

Two (2) locks which will not fall out when the cabinet lid is open.

Mounting holes in corners of backboards are metal bushed so as to prevent splitting or marring of woodwork.

Circuit wiring run in grooves in the woodwork which is afterwards filled with hot beeswax to prevent entrance of moisture, gives permanent and lasting results.

All exposed metal parts are entirely insulated from circuit, preventing disagreeable or dangerous shocks.

Last but not least, a talking circuit consisting of the new Dean transmitter, receiver and induction coil which will talk perfectly through the longest lines.

The above are some of the reasons why Dean telephones are enthusiastically adopted.

Let us send you one of our thirty-two page Bulletins No. 101 A, which give complete description and circuits.

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FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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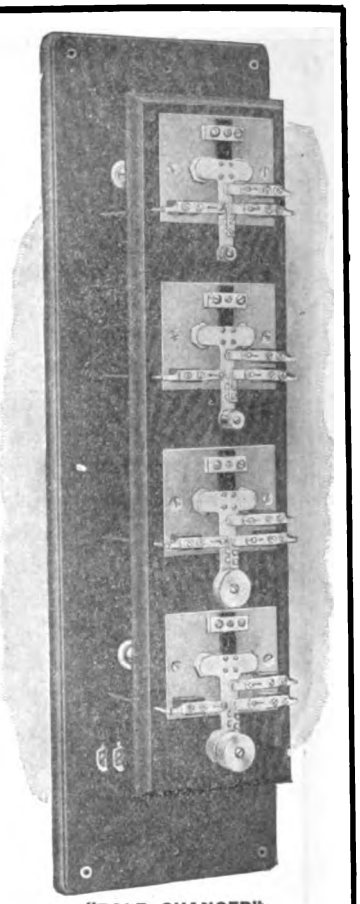
KELLOGG

FREQUENCY POLE CHANGER

Utmost SIMPLICITY of operation

THIS POLE CHANGER can be used on common battery or magneto exchanges.



"POLE CHANGER" COVER REMOVED

Advantages:

1. Requires very little attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
5. Operates successfully on any standard voltage of a telephone exchange.
6. Practically noiseless in operation.
7. Only THREE contacts on each Vibrator.
8. The vibrators have a very long spring, hence they will not break or change the frequency.

THE TRANSFORMER CABINET contains all necessary Switches, Fuses, etc.

Pole changer cabinet and transformer cabinet separate.

Can be put in different rooms if desired.

Sold separately or complete.

No additional apparatus needed on power board already installed.

TRANSFORMER CABINET

Send for "Folder No. 3 A" *Correspondence Solicited*

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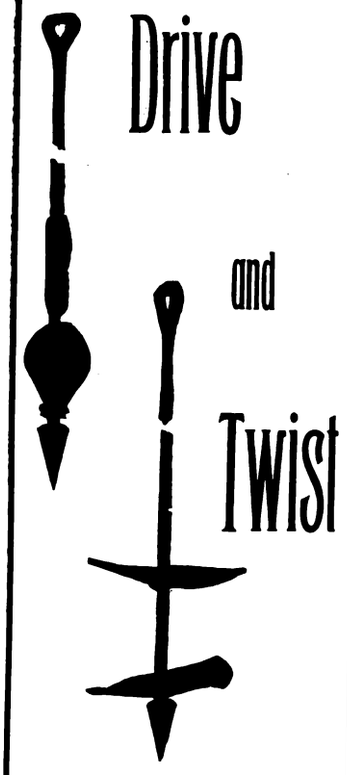

Have You Seen Our New Anchor

equipped with two sets of blades at right angles to each other. This anchor is immovable by any direct strain when once set.

It is installed by Driving and Twisting, the same as the earlier type.

This anchor is especially fitted for hard and stony ground and can be set in one-tenth the time required for any other type.

Write for New Catalogue

THE D. & T. ANCHOR CO.
LA CROSSE, WIS.

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Swisher Marline Cable Hanger

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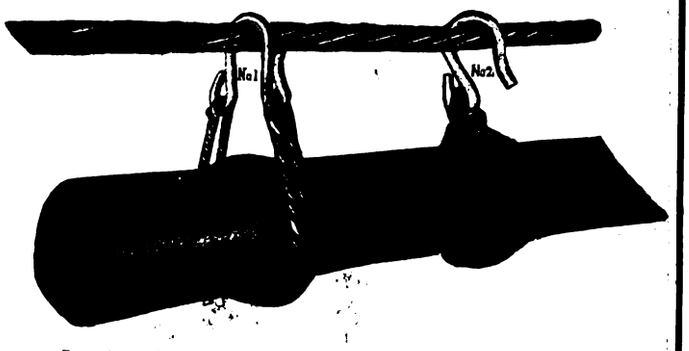


In the above illustration we show in figure No. 1 the Swisher Marline Hanger, in figure No. 2 the old style now in common use. The advantages we claim for the Swisher Hanger are: First, easy to install. Second, greater strength. Third, hook cannot become detached from strand. Fourth, hook cannot straighten under strain and let cable down. Fifth, in stringing of wires over cable, wires sagging will not catch under hook as in old style. Sixth, after cable has been installed, same can be pulled without opening the hooks.

We use only the best grades of marline and No. 9 hooks galvanized after forming. Our No. 9 hook on account of its construction will stand a greater strain than a No. 6 hook of old style.

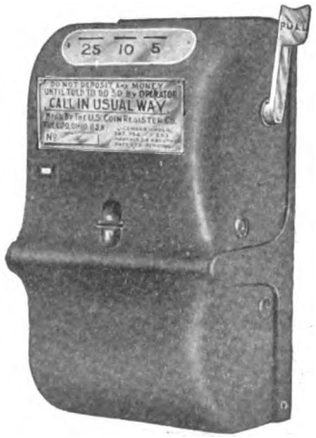
Send for Catalog No. 3 of Nagel Specialties

THE W. G. NAGEL ELECTRIC CO.
TOLEDO, O.

COMBINED

Cash Register and Pay Station

THE BEST TELEPHONE SERVICE



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A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

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It protects both patron and company.

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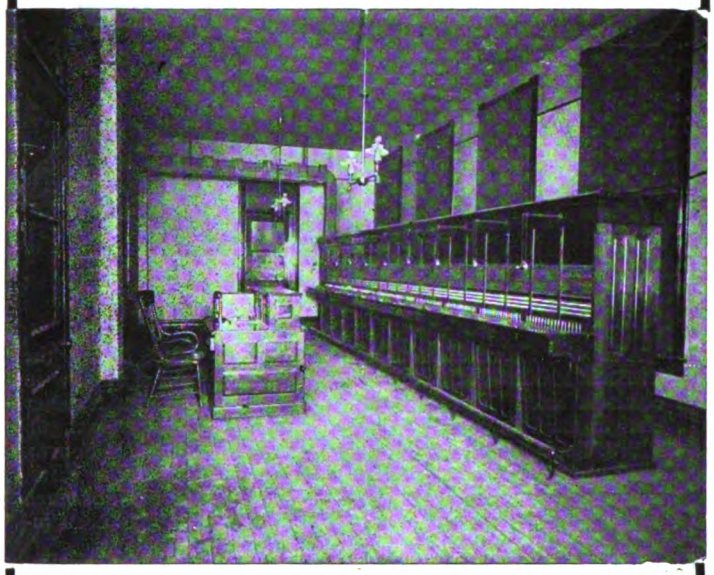
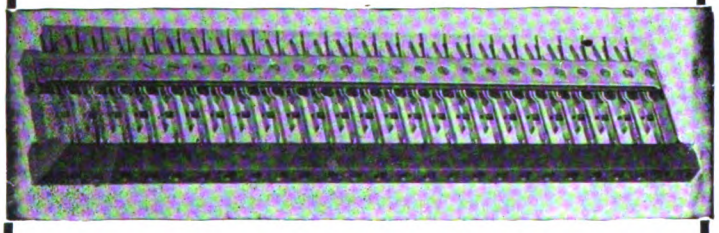


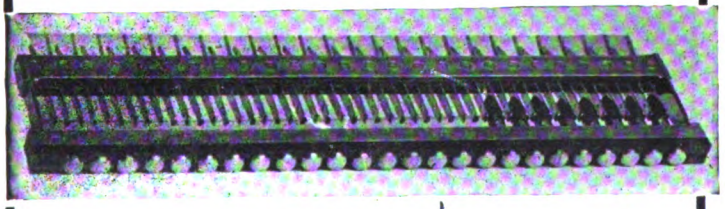
1500 LINE BOARD

SWITCHBOARDS

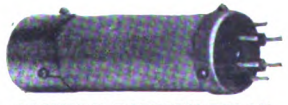


MULTIPLE JACK STRIP 25 JACKS

3 WAY MULTIPLE PLUG



LAMP JACK STRIP



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SECURITY, CONVENIENCE, SAFETY AND ECONOMY

SECURITY POLE SEATS are cheap notwithstanding the special machinery used in their construction or the quality of material.
Made of angle iron--bent corners. Iron cross bars machine riveted. No rough edges to tear hands or clothing. Weighs only 28 pounds and will carry a ton.
You will be pleased on investigation.

Novelty Potheads and Sleeves

Made of selected brass. No expert plumber needed to fit head or sleeve. Always ready for inspection or removal. Waterproof after inspection same as before. Samples sent on trial. Complete information and blanks for ordering, upon request.

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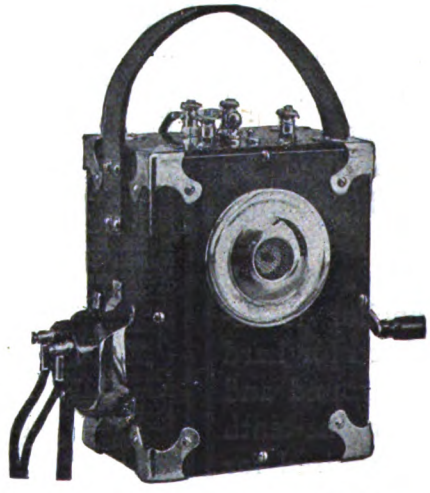

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complete with Generator, Ringer, Transmitter, Battery, etc.

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LIGHTEST AND MOST SATISFACTORY.

We have sold more test phones during the past year than any two manufacturers.

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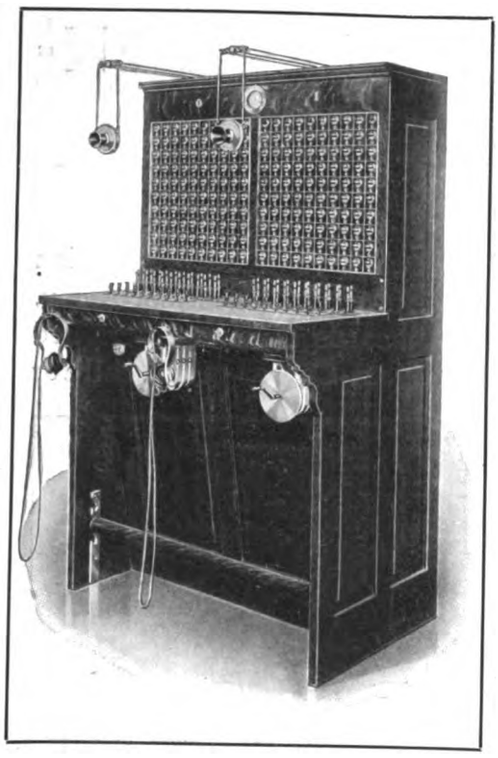


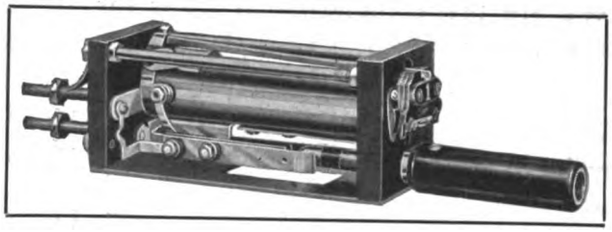
No. 301—200 line capacity switchboard equipped with 200 No. 68 self-contained self-restoring shutter drops.

Ask for Souvenir B.

SWITCH-BOARDS

of Any Desired Capacity

All of our switchboards are wired to their full capacity. Cabinets are furnished in any capacity with any desired number of drops installed. All drops, cords, plugs and cable wiring made for full metallic circuits. All boards wired with sufficient cable to reach distributing board.



No. 68—Self-restoring switchboard drop.

One or more pair of cords connected to repeating coils, thus making it possible to connect metallic circuit and grounded lines to same board. This equipment is A1 in every particular. If you are interested we will gladly send you complete specifications and prices.

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Why doesn't it pay you as well as the best of your investments?

Is the reason bad management or bad equipment? More likely the latter.

Probably the company is trying to do a 20th Century business with 19th Century apparatus.

If that's the case, it is spending more and earning less than it might if it had our Automatic Telephone equipment.

This is the only really modern telephone system. It produces the ideal telephone service—quick, sure and secret—at half the operating expense of a manual equipment, and this service commands better rates.

It costs a fixed price per hundred lines to enlarge the automatic exchange, instead of an increased price per each hundred lines, as in the manual equipment.

The automatic exchange is never outgrown; it never has to be "scrapped" and replaced by a complete new one, as with the manual. You just add to it as you do to a sectional book-case.

All these points bear upon the stability and value of your telephone securities. They mean dividends to you.

Over ninety per cent. of all the large orders placed during the past few years, either for new installations or replacements, have been for our automatic system, and all the companies adopting it have, from the increased earnings, been able to pay the interest on their bonds and a good dividend on their stock.

Our Automatic System has been adopted in the following cities:

Aberdeen, S. D.
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Auburn, Maine.
Auburn, N. Y.
Battle Creek, Mich.
Bellingham, Wash.
Berlin, Germany.
Buxton, Iowa.
Cadillac, Mich.
Chicago, Ill.
Clayton, Mo.
Cleburne, Texas.
Columbus, Ga.
Columbus, Ohio.
Dayton, Ohio.
El Paso, Texas.
Fall River, Mass.
Ferguson, Mo.
Florenceville, N. B., Can.
Grand Rapids, Mich.
Hastings, Neb.
Havana, Cuba.
Hazleton, Pa.
Hopkinsville, Ky.
Jonesboro, Ark.
Lake Benton, Minn.
Lewiston, Me.
Lincoln, Neb.
Los Angeles, Cal.
Manchester, Ia.
Marianao, Cuba.
Medford, Wis.
Miamisburg, Ohio.
Mount Olive, Ill.
New Bedford, Mass.
Oakland, Cal.
Ocean Park, Cal.
Pentwater, Mich.
Perry, N. Y.
Portland, Me.
Portland, Ore.
Princeton, N. J.
Riverside, Cal.
San Diego, Cal.
Santa Monica, Cal.
Sawtelle, Cal.
Sioux City, Ia.
South Bend, Ind.
St. Marys, Ohio.
Tacoma, Wash.
Toronto Junction, Canada.
Traverse City, Mich.
Van Wert, Ohio.
Watch Hill, R. I.
Wausau, Wis.
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Wilmington, Del.
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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets, CHICAGO, U. S. A.

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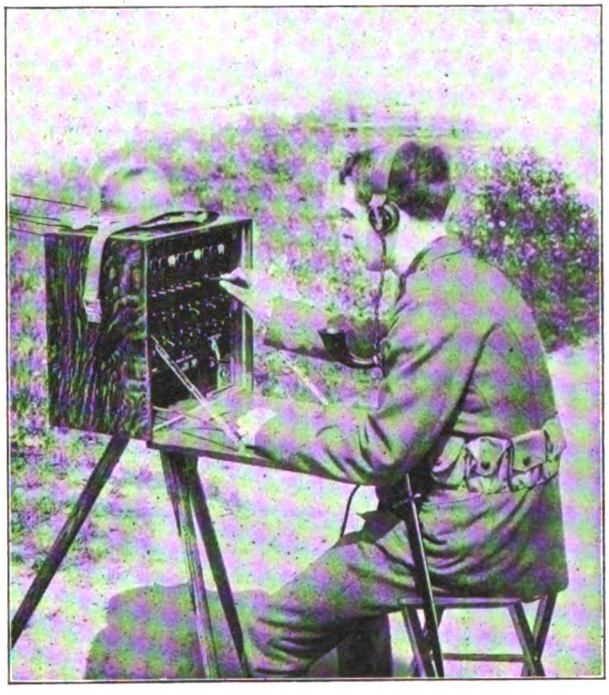
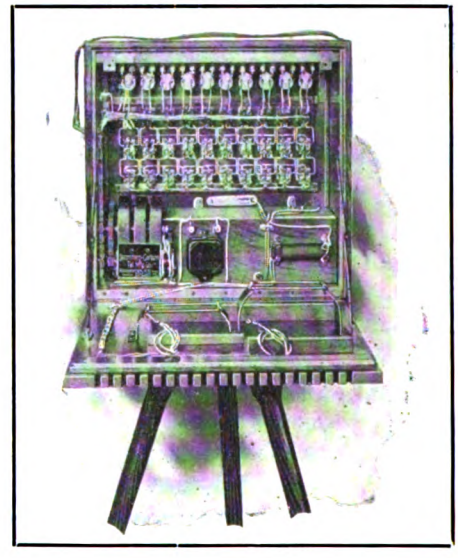
STROMBERG-CARLSON GOVERNMENT SWITCHBOARDS

A NEW TYPE OF SWITCHBOARD FOR ARMY USE

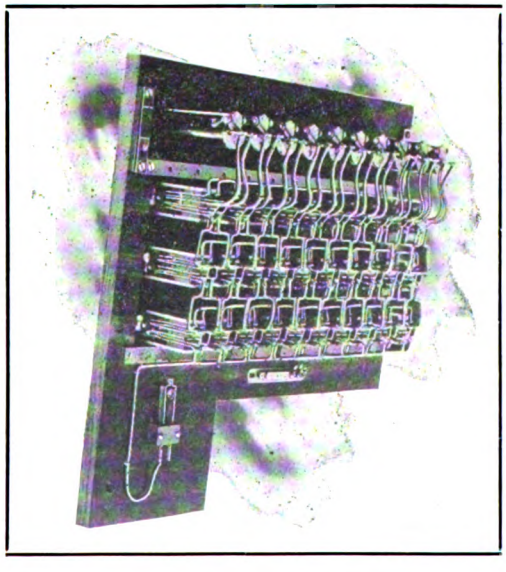
THEIR extreme simplicity and ease of operation together with the well known reputation of the Stromberg-Carlson apparatus appealed to the Signal Officers of the U. S. Army. We are just completing an order for twenty of these switchboards built and designed from exacting specifications prepared by the Engineers of the Signal Corps, which call for apparatus that will be most serviceable in the field and withstand the various conditions and changing climate.

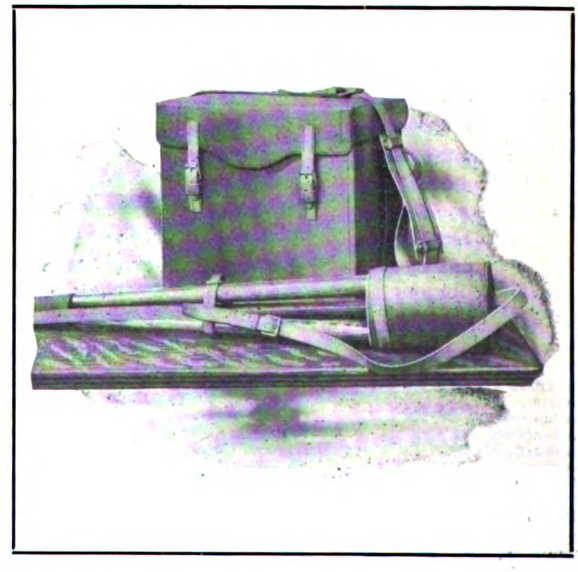




The switchboards here illustrated are of the cordless type, equipped with ten line drops, ten ringing and listening keys for connecting the different lines together. In the manufacture of these instruments it has been interesting to serve the Government officials and the ingenuity and excellent results obtained are apparent.

This work may be considered a new branch of the telephone business, demanding the best efforts of its Engineers and the very highest standards of the manufacturer's art which are essential to receive the final approval of the Chief Signal Officer of the United States Army.





STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N. Y. **CHICAGO, ILL.**

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WE MAKE CABLE

If all Telephone Men

throughout the country could get together and hold an experience meeting, positive proof would be forthcoming that the straight and narrow way is the cable way, and that all those who are struggling along on the byways of open line construction will be down and out unless they make haste in changing their ways.

It stands to reason that a system of distribution which reduces line troubles to an almost negative point is far superior to the old scheme of open lines. The right kind of cable will do this, and that kind is Stromberg-Carlson.

However, lest there should be any doubt in your minds as to the veracity of our statements, we have secured the testimony of several men who have travelled both roads.

P. Kerr Higgins, whose reply to our inquiry is given herewith, has had 23 years' experience in maintenance, construction and engineering.

Ten years were spent with the National Telephone Company of Great Britain; three years with the Chile, S. A., Company; six years with the Central Union, and four years on the Pacific coast with the Home Tel. Co., the United States Long Distance Co., and as a consulting engineer.

Mr. Higgins gives his views concerning the relative merits of cable construction and open wire lines in the following letter:

Oklahoma City, O. T., March 28, 1906.

Gentlemen: I am decidedly in favor of using all the cable possible. The modern telephone system must have a large percent (if not all) of its lines in cable for the following reasons: (1) It means superior service to the subscriber. (2) The minimum amount of trouble. (3) Minimum maintenance help and consequently minimum expense. (4) Minimum construction force, both in erection and additions to plant. (5) The foregoing being true, its use simplifies records, reduces the work of the manager and the office force and in this way effects a saving throughout the entire system.

The best way to prove the above is either to try it or segregate the trouble, where both aerial wire and cable are in service. It is now possible to prove the foregoing statements by writing those who have had experience with cable plants for detailed data, which cannot now be disputed as it is no longer an experiment, but a demonstrated fact.

A close examination of trouble in cable and open wire plants shows that the comparison between the two is as 1 is to 58; one being the cable plant and 58 the aerial.

Yours very truly,

P. Kerr Higgins.

Of course, you are convinced that cable is the construction to adopt. If you will write for our booklet 79B you will find abundant reasons for placing your order with us.

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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Every Wire Connection

No. 5—Spring Binding Post.

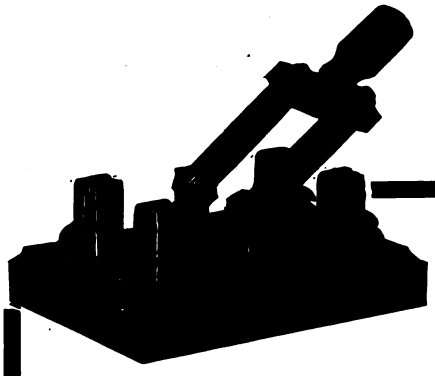
in the exchange, or at the subscriber's station is better made with

Fahnestock Spring Binding Posts

than in any other way.

Our **NO. 5 POST** illustrated this week is fitted with a lug to which the wire is soldered. This post will take receiver cord tips or wire of equal or smaller size. It is used also for operators' transmitter cord tips, for attaching battery and ringing leads to the switchboard, and many other purposes. We will make special posts from your suggestions. Write us. The Fahnestock is the standard binding post for batteries. Write for sample and prices.

Fahnestock Electric Company
129 Patchen Avenue, Brooklyn, N. Y.



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in an efficient and economical manner install

TRUMBULL ALL COPPER SWITCHES

in series with the line at the sub-stations. Then when a thunder storm is imminent the subscribers open the circuits. If the switch is placed between the lightning arrester and the line, many a tedious trip to clear grounds will be obviated and consequently the maintenance charges will be reduced.

Trumbull switches are the only ones which should be used for this purpose, as they possess mechanical and electrical advantages not found in any other type.

Ask for our new catalogue.

TRUMBULL ELECTRIC MFG. CO.
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BELDEN JUMPER WIRE

is a tinned copper conductor, insulated with single or double silk wrapping and one outside cotton braid.

STANDARD COLORS

RED WHITE BLUE

Made single or duplex conductors and saturated with bee's-wax compound or treated with BELDEN flame-proofing solution.

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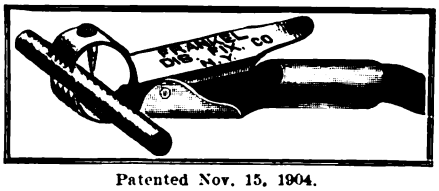
If Your Supply House Don't Handle Them—Order Direct

Frankel's Electric Testing Clips

TIME, LABOR AND MATERIAL SAVERS

No more baring the wires. No lineman's grip complete without them.



Sample doz. $1.50 doz.
Lots of 100, $11 hundred
Lots of 500, $10 hundred
Lots of 1000 $9 hundred

Patented Nov. 15, 1904.

The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect test connection

FRANKEL DISPLAY FIXTURE CO., 740-742 Broadway, N.Y.

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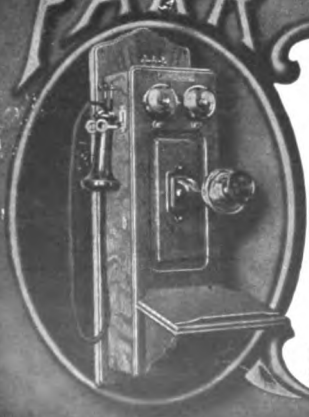

FUNDAMENTAL REASONS FOR OUR SUCCESS

Faith is placed in our products by satisfied customers in every State

All our goods are guaranteed. (We could not afford to do this if they were not right.)

Reliability has ever been the strongest point about our apparatus and these are the

Reasons why our business has grown so rapidly.

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118-120 W. Jackson Blvd., Chicago. A. S. KEELER & CO., Coast Agents, 90 2d St., San Francisco

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VOLUME XIII *SATURDAY, JUNE 2, 1906* *NUMBER 22*

Organization in Telephone Work

By P. Kerr Higgins.

No surgeon would attempt to perform any operation until he knew the functions and position of each and every organ of the body with which his instruments would come in contact. In no greater degree is a general manager qualified to organize or systematize any company unless he is thoroughly familiar with the details or units of its organism. The load of carrying on the company's affairs must be as evenly distributed as possible and while he does not allow himself to be taxed with the burden of numerous persons reporting on unnecessary details, yet his lines of communication are so laid that he can at will probe into any point or part he may suspect of weakness. It is found good practice in a large company with, say, over 15,000 subscribers to have a general manager, whose immediate assistants are a business manager and a general superintendent, as shown in the chart of organization.

In the first place the general manager should be accessible to all the executive officers, as he is the head of all departments; the ideas of several men are difficult to transmit to departments, and it is therefore his office to gather information from all available sources and then issue the required instructions to subordinates.

The authority of the general manager has usually a fixed limit as to expense. Up to this point his word and judgment are law, while beyond this he must consult the advisory board or executive committee, and beyond them it is referred to the board of directors who have "carte blanche" from the stockholders. All reports pass in through the channels indicated in the chart, are condensed by the heads of departments, in accordance with a pre-determined plan and chart, and pass on to the general manager for approval and to complete his report. His duties then may be summed up as follows:

Meeting the public on all vital questions; appointing chiefs and organizing departments; approval and authorization of all expenses; receiving and tabulating of all reports; approval of all purchases; fixing of the salary schedule for all employees; general supervision of the plant; making of stated reports to the directors; making of banking arrangements, rebates, notes, special contracts, etc.

As was shown in the organization chart presented in the first article of this series he divides up his work into two distinct sections, the business section and the operating section, and appoints a head for each. As indicated, the business section is divided into three groups: Buying, selling, and accounting.

The business manager is the representative of the general manager and reports to him for the departments under his charge. His special duties are: Buying at lowest price of the best material; the collecting of all accounts; obtaining the best prices for contracts; accounting; passing on all material requisitions; making all reports called for by the auditor if there is such an officer, and if not making such reports for the general manager. In any case a copy is sent to the general manager. He has no authority to change records or methods without the approval of the general manager, and makes it a practice to keep in touch with him at all times so as to carry out his wishes.

O. F. French, General Manager of the Cuyahoga Telephone Company, is the Active Head of an Organization Which Has Achieved Conspicuous Success in Telephone Operation.

At the head of the purchasing department is an official who is commonly called the purchasing agent. He does all the buying for the company under the direction and guidance of the business manager. Any contracts or purchases out of the regular requirements of the plant are submitted by the business manager to the general manager for approval. There is in every plant a certain amount of material or parts of apparatus which must be kept on hand. All this comes under the head of regular requirements. The purchasing agent is held strictly responsible for: The obtaining of the best material at the lowest possible prices; the condition of the stock on hand; the quantity of the stock on hand. He is usually required to have compiled or tabulated, for easy reference for any one in authority over him, a complete list, alpha-

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betically arranged, of all material necessary in the business, showing the prices obtained and the parties from whom bought. He is also supposed to route the purchases to the best advantage and such routing should be shown on the record together with the reason for so doing. He is required to have on file at all times a monthly inventory (for each month) showing the material on hand, en route or ordered and probable date of arrival. It will be his duty to keep the business manager posted regarding necessary supplies and keep in touch with him, so that officer may know just what is being done in the department.

ARTICLE								
SIZE			LOTS OF			REQUIRED		
DATE QUOTED		BY WHOM	TERMS				DELIVERY DAYS	REMARKS
			PRICE	DIS.	DAYS	F.R		

Fig. 1. Form used by purchasing agent for quotation or market record.

With this end in view it is customary to make the business manager a detailed weekly report. The storekeeper's assistants (if any) and clerks are directly under his charge and he is responsible to the business manager for the discipline and operation of his department. Buying and selling are the most important elements in any successful business, and success usually depends on the method of handling these departments. In order to buy to advantage, the purchasing agent must be familiar with the market and of necessity must have an intimate knowledge of the goods he is interested in purchasing at the best market prices. To this end he must know every manufacturer in the special line of goods he requires. These goods should be plainly classified. This record is frequently kept in the loose leaf form, but the card system can also be used to advantage. A card being made out for each article and the cards arranged alphabetically. This serves at once as a price list, cost list, store record and market list. If kept up-to-date it should serve as a check on the inventory return of the storekeeper, which check is frequently found very convenient and even necessary. When quotations are received they are immediately entered up on the card of the article on which they have been received, with the name of the firm quoting, price quoted, discounts, terms, etc. Where a large number of catalogues is carried it is found very convenient to number them and to refer to them by number. Having made the purchase this is also noted in the same manner. The storeroom record and the purchasing items can be kept on two separate cards, if found advisable. All orders for material should be made on a special blank for that purpose, and carefully numbered and entered on order card. In small exchanges this may be simply copied on carbon paper and filed, but in large exchanges, where much purchasing is done, the record-

ARTICLE			LOCATION							
MAXIMUM			NORMAL	MINIMUM		DATE OF INVENTORY CHECK				
DATE OF ORDER	ORDER NUMBER	AM'T REC'D	ON HAND	DATE ISSUED	AMOUNT	BAL.	DATE ISSUED	AMOUNT	BAL.	

Fig. 2. Method of keeping inventory check which enables purchasing agent to know the amount of stock on hand at any time.

card is necessary, filed in same manner as the market or purchasing card. When the material ordered has been received it should be carefully checked up and marked short or O K on the order card together with date of receipt, condition of material and initials of checking clerk. The market prices should be checked up to date on all regular material at least twice a year, whether any of that material has been bought or not. The stock received is as important as the market record, hence should be carefully kept up to date. From this the purchasing agent is able to know when is the best time to buy, what he needs, and also gives a comparative statement of amount of material used over a given period and from this he can tell whether or not it would be economy to purchase in large or small quantities. Having checked the goods and found them as per order, invoice is filed to be again taken up at the end of the month. All orders on being given must be filed in the follow-up file, so that should any delay take place it will at once be detected. This file is usually filed according to months and days, and the order copy filed on the day near which the goods should arrive. This record tells at once if an order has been placed and when; it also tells about how long it takes to fill such an order, thus enabling the purchasing agent to know how far in advance he must order so as not to be delayed. In this stock record a note of all tools, furniture, stationery, etc., should also be kept, so that everything may be known, even how long tools or furniture have been in use. This data may be called for at any time by the board of directors and should be forthcoming.

The head of this department is usually known as the contract

NO. ---------- DEPT. ----------

DEPARTMENT REQUISITION

TO PURCHASING AGENT

PLEASE ORDER THE FOLLOWING DATE ---------

AMOUNT	DESCRIPTION	WHEN NEEDED

SIGNED

Fig. 3. Form used for notifying purchasing agent that additional material is needed.

agent, because all telephone work is done on a contract basis, and while the price of a single telephone for residence or business is a fixed quantity, the special equipment, which is very extensive, varies much in price according to the needs of the case. The contract agent has full jurisdiction over his department under the direction of the business manager. The importance of this department, like that of the purchasing, is not fully appreciated by a large majority of companies. It should be in the hands of an expert salesman, because this is, after all, what he is or ought to be; a man capable of not only doing the work himself, but of educating and directing others how to do it. The work must be systematized and records carefully kept of all inquiries, visits of solicitors, "follow ups," etc. There is a vast difference between planning to sell goods and selling them, and it is rare that a man is found in whom these two characteristics exist. Telephone business is probably easier than the average work of a salesman, but nevertheless calls for rare judgment and tact. There was a time when any one could have been a telephone solicitor, but this was before competition. Now things are changed; we have two companies and every patron lost is two gained for your opponent. Few people realize this, but it is true. Having found out that some one is in the field who wants a telephone or special equipment, a card showing the name, address, date, requirements, and name of canvasser is made out and filed in the prospective cabinet, and the solicitor goes forth to get the order. Such a solicitor must know and be posted on the work in hand; if a telephone is wanted, he must know how

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many subscribers his company and also that of his opponent has, quality of service, prices, etc. He must be possessed of the usual characteristics of a good salesman—tact, patience, even temper, perseverance without rudeness, politeness and a careful regard for his personal appearance. If special equipment is desired, in addition to the above qualifications, he must know the combinatons possible for telephone business, or at least the ones most generally called for, such as private, private-branch exchanges, intercommunicating systems, extensions, extra bells, etc. He should first ascertain from the prospective user his requirements, then find the combination that will fill them. If none of the special equipment in use seems to meet his needs, then he will make a memo of them and return at once to his superior for instructions; the matter should not end here, but should be followed up at once, if possible the same day. Purchasers may be divided into three classes, those who really want to buy, those who think they want to buy and those who should buy, having the means and to whom telephone apparatus would be a convenience. Before approaching the purchaser, the solicitor of business will study his man, finding out his name, characteristics, likes and dislikes, so that when he approaches him he will be in some measure ready to handle him in the proper manner. If possible, he should get to see him before his competitor has a chance, and should give him all the points he possibly can at the first interview, avoiding carefully any mention of his opponent. In this way when the opposition salesman arrives on the scene, he is at once put on the defensive by the prospective purchaser and thus handicapped in the sale; in other words, fix in the mind of the prospective purchaser the standard and requirements of your apparatus, for all purchasers desire to seem to possess knowledge of the thing to be purchased, and so it pays to go into detail with him and from the information thus given the apparatus of the second caller will be judged. It is good practice to avoid generalities and hold to facts; tell the truth and avoid anything that would reflect on your company or apparatus. Find out, if possible, how much he knows of the apparatus under consideration and avoid permitting him to make you feel he knows more than you do regarding its workings, as this is liable to embarrass the average solicitor, and can easily be avoided by using a little tact and common sense. If possible he should be shown some parts of the apparatus or a similar apparatus in operation and should also be invited to visit the operating room and see the system in every day use. As the business of the telephone company originates in this department, its affairs must of necessity be in the hands of a competent contract agent, who in addition to his abilities as a salesman and educator of salesmen, has familiarized himself with telephone work. He is and must be held responsible for securing business for the company on the best possible basis, for the character of the contracts, and see that they are taken according to the adopted rates for the various classes of service furnished. The moving of telephones, changes in equipment, keeping the directory department

RECEIVING CLERK — DATE

INVOICE NO	DATE OF BUSINESS	ARTICLE	DEPT.	AMOUNT	DISTRIBUTION					
					STATNY	TOOLS	MAIN	OPER	CON	ACCOUNTING

Fig. 4. Form used for invoice and distribution of material in purchasing agent's department.

posted as to all take-outs, changes of address and new contracts, he also furnishes the same data to the cashier's and records departments. He will also issue all intallation, take-outs, removal and change of equipment cards, and these should be done in such a manner as to prevent mistakes or a misunderstanding. All cards will be carefully made out records, using a follow-up case, so that no undue delay may ensue. It will be his duty to follow up through the business manager any apparent delay in filling orders and find out the reason, thus being enabled to post the customer as to the progress of his order—whether it can or cannot be filled, and when. If there is any one thing a patron will appreciate, it is attention to his orders, and this must always be done. Never promise anything unless there is every reason to believe it can and will be accomplished. In view of the fact that trained men are necessary to the success of the contract depart-

NAME — TEL. NO.

ADDRESS

RECOMMENDED BY

DATE OF EMPLOY	POSITION	SALARY	SALARY INCREASE
Aug. 1, 1901		$70	1/6/02 $75

WHEN LEFT SERVICE — WHY

REMARKS

Fig. 5. Form used for employee's record, to be retained permanently in files.

ment it is found expedient to have a few "understudies" attached to the regular force, so as to avoid interruption by the resignation or removal of any solicitor. No salesman can make a complete success unles he has made a careful study of the "laws of suggestion." It applies with equal force to the corporation as to the individual, and frequently is the one element that closes a sale, but it must be applied judiciously. The individual needs it to stimulate and build up his own character, especially during the "off days" when everything seems to go dead wrong. The head of the department must be a salesman, for the salesmen or solicitors under him look to him for the solution of their difficult cases and all the "hard nuts" are passed up to him for adjustment or solution; then the solicitors under him are nerved or braced up with the knowledge that the man behind them is their superior in every way. This same rule applies to all departments. The work of each man should be tabulated and posted for reference, as also the data showing the gain and loss during the preceding month.

JOPLIN HOME TELEPHONE COMPANY INCREASES EQUIPMENT OF ITS SWITCHBOARD.

RECENTLY ordered additions to the switchboard of the Home Telephone Company, of Joplin, Mo., will increase its capacity by 600 lines. The company has also placed an order for a new toll board which has become necessary on account of the rapid growth of the company's long distance business. During the coming summer there will be effected a number of general improvements which will enable the company to handle a largely increased volume of business.

THE POPE FINDS THE TELEPHONE A GREAT CONVENIENCE.

SHUT up within the massive walls of the Vatican, Pope Pius X finds the telephone a great blessing. His Holiness recently received the director of the Venetian telephone system and was delighted to hear that with the new connection between Venice and Rome it would be possible for him to speak to his relatives at Riese, his native village. "If I cannot see them it will be a great consolation to at least hear their voices," exclaimed the Pontiff.

The telephone is installed in many parts of the Vatican. Twice a day the Pope rings up his three sisters, who live just outside the Vatican walls; and he keeps in daily communication with his secretary of state, Cardinal Merry del Val, during the latter's absence.

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Economical Telephone Accounting and Filing Systems

ARTICLE V.—A DAILY RECORD BOOK FOR A TOLL STATION.

*By Charles C. Wilmot, Telephone Accountant.

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In a large telephone system having many toll stations in country crossroad stores, postoffices and other places, the amount of commissions paid is small, and it is almost impossible to get accurate reports by the usual bookkeeping methods. The form illustrated in connection with this article was designed to outline a recording system which would be easily made out and verified, and so simple as to be proof against error. As a matter of fact, the company for which this form was originally designed and by whom it was first put in service was accustomed to receive from the traveling auditor after every toll station trip reports that accounts were commonly kept on tops of sugar barrels, loose slips of paper—in fact, anything convenient at the moment the message was recorded. To trace the different messages or ascertain the amount due the company was almost a hopeless task. Since the installation of the new system this company has found that one book of 100 duplicate reports is the only record needed. Best of all, the cash receipts have increased and the number of errors and complaints has been greatly reduced.

Although the forms for in and out messages are shown separately here, in practice they are arranged on one continuous sheet, with the binding attachment in the middle, so that the two forms appear as opposite pages in the book. The original sheets are provided on the back with a monthly report form similar to that shown in Fig. 9, which appeared in the issue of the American Telephone Journal for February 24, 1906. The original sheets are torn out once a month, the summary on the back filled out, and then the sheet is forwarded, accompanied by a remittance, to the general office. The carbon copy is left in the book for a local record.

This form has recently been revised to meet the latest rulings of several traffic associations. Forty in and out messages can be entered on every double page of the record. It has been found desirable to issue for the instruction of station agents full printed instructions for the use of agents at the toll stations. These will explain the purpose of the different columns, and are given in full as follows:

Toll Service: Every message sent or received must be recorded in the daily record book, great care being exercised that the originating and receiving operators check messages accurately and in accordance with the Routing and Tariff books. Spaces are provided in the record book for full information necessary for recording each call, special attention being directed to "overtime" and "messenger service," which must, in all cases, be properly charged and reported. Always have the carbon sheet in proper position so that a duplicate record will be made.

"In" and "Out" Business: *Column No. 1. Item Number*—This column indicates number of messages recorded on each page and will be used mainly as a matter of reference in correspondence by the general office with toll stations, as: "Your item No. — on your report for, etc."

Column No. 2. Rate Column—Enter here the correct day rate.

Column No. 3. Day or Night Message—If "night" rate, insert the letter "N" on line of entry in this column.

Form C-66.

IN BUSINESS

Report to Citizens Telephone Company, Grand Rapids, Mich.

MESSAGES REC'D AT _____ OFFICE, FOR MONTH OF _____ 190

NO. 1						NO. 2	NO. 3	NO. 4			NO. 5				NO. 6	NO. 7
ITEM NO.	Day of Month	Tel. No.	PARTY CALLING	AT WHAT PLACE	PARTY WANTED	RATE	Day —D— Night —N—	TIME A Began	TIME B Ended	Over-Time	CHARGES Tolls Rec'd Paid		CHARGES Tolls Rec'd Collect		CHARGES Mess. Fees Earned	SWITCHING STATION	REMARKS
1																	
2																	
3																	
4																	
5																	
6																	
37																	
38																	
39																	
40																	
41					PAGE TOTALS												

N. B. We Allow no Commissions on Company or "Dead Head" Messages. Note this Class of Messages in "Remarks Column."

Fig 18. Form No. G-66, used for reporting from toll station to general offices. This side for "In" messages.

Column No. 4. —Time—In Section "A" and "B" enter the time of beginning and ending of message. Section "C": This column is to include all "overtime" to be shown in "minutes," for time in excess of three minute service.

"Out Message." Column No. 5. Charges—Section "A." "Tolls sent paid": This column is to show the total cash received for each message, which should include both the three minute rate service fee and the charge made for overtime. The overtime should also show in minutes in "overtime" column. (See column No. 4, Sec. "C.")

Section "B." "Tolls sent collect": This column is to include the amount of all service explained below:

Tolls sent collect are calls originating at station, the charges of which are to be collected by the station receiving them. Great care must be shown in having a thorough understanding with the receiving point that the reversing of such charges is permissible, and that the collection of these tolls will be made.

* Editor's Note.—Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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Section "C." "Messenger fees collected": This column should show the amount of all fees as per explanation given below:

Messenger fees collected are the fees collected by a station and charged on originating calls in addition to the regular tariff. The utmost care must be used that the amount collected corresponds with the fee asked by the terminating station.

Reversed messenger fee charges are absoluely prohibited. All such charges must be collected at the forwarding station.

Column No. 6. Switching Station—Under this heading should be recorded the name of the first switching station. That is to say, where it is impossible to ring directly the station wanted, record the name of the station that does the calling. This information is very important, as it enables the general office to give the proper credit of mileage to the company over whose line the message was forwarded.

"In Messages": Column No. 5. Charges—Section "A." "Tolls received paid": This column is to show the total cash received (at originating office) for each message, which should include the three minute rate service fee and the charge made for any overtime, as per explanation given below:

Tolls received paid are calls terminating at a station the charges of which have been paid and collected at the forwarding point. As much care should be taken in recording these messages properly as of "sent" calls; otherwise false charges or credits will be created for or against a forwarding point.

Section "B." "Tolls received collect": This column is to include the amount of all services explained below.

Reversed Messages—For the convenience of the public, charges on originating tolls are permitted to be reversed to the receiving point, providing instructions are properly given by the sending office to the receiving office before the conversation is held. The office receiving the reversed message should record it under the column "tolls received collect." A notation should be made opposite the record in remark column showing that the message was to be reversed or paid at the receiving end.

Messages on Company Business—It is of the utmost importance that every message of this description is checked the same as a full paid message, and recorded in the daily record book, and notation should be made after the record of such messages, "Co. Bus." The total amount of these messages should be deducted from the total amount of "Tolls sent paid and tolls received collect," as no commission is allowed on "Co." messages. The item of "Co. Business" will be approved if satisfactory.

Monthly Toll Reports—Total each column. On the reverse side of the "Out business" sheet will be found a regular blank form for a report of the total month's business and settlement. divided into debits and credits. These are to be made out in accordance with the following instructions:

Debits: Item A. Any balance due telephone company from last month, with the exception of error sheets, is to be debited after this notation.

Item B. Telephone receipts this line for "tolls sent paid." Messages on company business must not appear here.

Item C. Toll receipts this line, for "tolls received collect."

Form C-68.

OUT BUSINESS } **Report to Citizens Telephone Company, Grand Rapids, Mich.**

MESSAGES SENT FROM _____ OFFICE, FOR MONTH OF _____ 190

ITEM NO.	Day of Month	Tel. No.	PARTY TALKING	PARTY WANTED	LOCATION	RATE	Day —B— Night —B—	TIME A Rates	TIME B Ended	TIME C Over-Time	CHARGES A Tolls Sent Paid	CHARGES B Tolls Sent Collect	CHARGES C Messenger Collected	SWITCHING STATION	REMARKS
1															
2															
3															
4															
5															
6															
-															
37															
38															
39															
40															
41					PAGE TOTALS										

N. B. We Allow no Commissions on Company or "Dead Head" Messages. Note this Class of Messages in "Remarks Column."

Form Used for "Out" Messages. This Form and that for "In" Messages Printed on One Continuous Sheet, Which is so Perforated that Either is Separately Detached.

Tolls received collect are calls terminating at a station the charges of which are reversed and are to be collected by the agent at the receiving point. Necessary precaution should be used to avoid the possibility of such calls becoming uncollectable.

Section "C." "Messenger fees earned": This column is to include the amount of all fees as per explanation below:

Messenger fees earned: This fee represents the necessary expense involved in obtaining patrons that are called on received messages. Before paying such fees the terminating station must ascertain to a certainty from the forwarding station that the amount will be paid, otherwise no credit will be allowed. Reversed messenger fee charges are absolutely prohibited; all such charges must be collected at the forwarding station.

Charges for Messenger Service—Special attention should be given to reducing messenger fee charges to a minimum, as in many cases excess charges of this nature have created a prohibitory rate for long distance service.

Messages on company business must not appear here.

Item D. Messenger service receipts.

Item E. Other sources (in detail).

Item F. Check errors—tolls. In debiting check errors give the month in which the errors occurred, together with the name of the station with which such omissions were made.

Item G. Check errors—account of messenger service.

Item H. Balance due manager: This represents any balance due manager on current month's business.

Credits: Item I. Balance due manager: Any balance that is due an agent from a previous month is to be shown after this notation.

Item J-K. Commission: Toll stations are entitled to a commission only on originating business, which consists of "tolls sent paid" and "tolls sent collect." No commission allowed on messages on company's business.

(*Continued on page* 361)

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Standardization of Methods and Appliances in Telephony*

By Frank R. McBerty.

IT is the work of the engineer to build a machine accurately fitted for a service. Ordinarily the requirements of cheap construction and proper operation are antitheses; a rough proportion is found to exist between quality of performance and labor of construction and operation. He must determine an adjustment between the quality and the cost of performance. To build a cheap machine that will not work is easy; to build a costly one that will work well is not difficult; to build a cheap one to work well is his sufficient task. The engineer then must provide a standard of performance, or a variety of standards to meet a variety of conditions. In telephony the standards must cover transmission, and promptness and accuracy of switching, since these are the particulars on which the salable quality of the product of the machine depends.

Although a rough standard of telephone transmission was established fairly early in the history of the industry, it is only recently that a rational use of such a standard has been made. With the advent of long distance lines, transmission equal to the conventional standard was found entirely inadequate for an increasing percentage of connections. To meet the new conditions, a new instrument was designed and a new standard was established, namely, the transmission from a solid back transmitter provided with two cells of Fuller battery in an aerial line of No. 8 wire, 200 miles long. In the lack of adequate data the assumption was made that all subscribers' lines would require the maintenance of such a standard transmission, and all equipments were judged in relation to the standard, with no great regard to local conditions. Doubtless in many cases the maintenance of the high standard required for connections of extreme length was not warranted by the occurrence or frequency of such connections in the locality and was needlessly costly. Studies of the percentages of conversations which are held over circuits having different resistances or losses up to the limits, which are now available, together with more accurate knowledge of the costs of maintaining different grades of transmission, now permit the determination of the quality of transmission which is adequate and suitably economical for any locality.

Ordinarily the transmission is affected by the nature of the telephone and transmitter, the resistance and insulation of the conductor, and the nature of bridges and repeating coils necessarily present in the circuit for other purposes. In determining the desirable grade of transmission, the transmitters and receivers, and the appliances in the circuit which may produce losses of energy ordinarily can be left out of account, since good judgment in selecting and arranging appliances is more effective in reducing the cost, without impairing the efficiency of service, than any efforts at cheapening these appliances would be. In general the cross section of the conductor is the controlling consideration in determining the economical grade of transmission. Increased cross section improves transmission in a diminished proportion but it increases cost of conductor, insulation and supporting or containing structures largely. For this reason the engineer should determine for each locality, in view of the electrical losses which will be encountered in varying proportions of the probable connections, the minimum grade of transmission permissible in view of the cost of conductors. The acceptance of a single standard applied uniformly to all cases would not seem to be in the direction of adequate planning.

To take examples; a town exchange remote from a city probably will be the center of a net-work of toll lines extending for some distance into the country. Only a small percentage of the local calls will enter the toll lines, and an extremely small percentage of those will reach such a distance as to tax the transmitting efficiency of the local system. Such a case would seem to call for a sacrifice of quality of transmission, to a considerable extent in favor of economy of construction. In the case of a large city, a considerable percentage of the conversations will be over long and profitable toll connections, while a great proportion will be through long cables. In such a case, manifestly a different standard of transmission must be established, dependent upon totally different relations between necessary grade of service and cost of giving it.

The standard of transmission should, therefore, provide a sliding scale, variable within wide limits and adjustable to actual conditions.

Only recently has a definite effort been made to establish standards of performance in switching connections. There are now available data which show the relations between cost of operating and various degrees of promptness in answering calls, and various degrees of accuracy in establishing connections. Improved service in these particulars involves increased expense in switchboards, central office space, operators' wages and trunk equipment. The cost of the three factors last named should weigh heavily in establishing the grade of service to be maintained in a given locality. Unfortunately, the determination is complicated by the fact that in those places where cost of real estate, trunk equipment and wages are highest, the demands for service of high grade are most imperative, but nevertheless, an adjustment should be reached in each case between the cost and the quality of the switching service. The engineer fails to exercise his function when he accepts unreservedly standards of performance which are established under unknown conditions in other places.

In the title of this paper I have referred to "standard appliances," in deference to current usage. Telephonic appliances are not "standardized" in the sense of being adapted or associated with standards of performance. Proposals to standardize appliances now being generally agitated are rather to reduce telephonic appliances to a few types for uniform application.

The important considerations tending toward so-called standardizing of appliances are, reduced cost of manufacture, reduced quantity of stocks, increased promptness of supply and universal knowledge of uses and maintenances. These considerations are to be weighed against several important disadvantages to which I shall refer later.

The most energetic promoter of standardizing appliances ordinarily is the manufacturer, whose interest it is to reduce costs by increasing the quantity of his uniform product. Frequently, however, the reduction of cost effected by standardizing fails to manifest itself in reduced price to the consumer. In such a case the standardizing of appliances falls short of the possible advantages. It is a matter of common experience that the making of a few special appliances is very costly; the making of a moderate number may approach the minimum possible cost; toward the minimum no great advance will be made with further increase of quantity of uniform product. This consideration indicates that special and unusual appliances in small numbers should be avoided whenever possible, excepting for definite experiments, or important special uses; that a variety of standard appliances used in considerable numbers may be preserved; and that a single type of appliance should be adopted for universal use only when upon careful study it is determined that an adequate grade of service can be attained by its use in nearly all cases.

In these times of extraordinarily rapid development in the telephone business promptness of supply from stock or manufacturer is an important consideration. Such promptness of supply can be attained only if the variety of appliances be strictly limited. The consideration may be a temporary one, however, and its weight often can be reduced by fore-knowledge and planning.

The advantages arising from familiarity with telephonic appliances appear both in relation to the public users and to the operating forces of the company. The public is strikingly incompetent

* Abstract from paper read before the Western Society of Engineers.

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in the operation of mechanism. Mere unfamiliarity with the telephone greatly retarded the spread of its use; the same cause operates against it with respect to any change, even a trifling one, which affects the mode of using it. The addition of a button to push during ringing, the substitution of an automatic for a magneto call, the requirement that subscriber give his order twice instead of once, or give his order in a particular sequence, involves long and patient education; the education of all users is never accomplished and the system labors under a continual burden of inaccuracy and frequent neglect to employ it when it would be successfully used, if it were familiar. We have no measure of the benefits in increased business and accuracy of service which would arise from uniform apparatus, but no doubt exists that substantial departures from uniformity are seriously harmful. It is to be noted that this consideration affects mainly outward appearances and modes of handling appliances, not their details of structure.

The efficiency of the operating companies' employes is largely dependent upon their familiarity with the structures. I refer not so much to the operators as to the construction, inspection and maintenance forces. The existence in a single exchange of a variety of appliances for the same general purposes very greatly increases the burden of educating these forces for their work; and during the process, which is never completed, faults in the structures are continually produced or permitted because of unfamiliarity with the less common appliances. It is a familiar fact that a lack of uniformity in the sections of the multiple board, by hampering the shifting about of the operators, may seriously impair the efficiency of the force. In constructing or maintaining the plant mere differences in the arrangement of terminals and colors of wire insulations result in defects in performance which are costly to locate and eliminate. So simple a deviation from common practice as requiring that the telephones be poled in the circuit has resulted in serious deficiencies of transmission in a large number of instruments. In ordinary mechanism lack of interchangeability of parts results in the obvious failure of the parts to fit in place. In the telephone industry misfits usually are not apparent; they are left to work their insidious evils unobserved.

The disadvantages of standardizing appliances are somewhat more general in their nature than the advantages. Possibly the most important of these is that standardizing prevents the natural selections which operate where a variety of forms are present to bring the fittest to the fore. Purchasing agents and telephone engineers do not proceed like the forces of nature in their selection of the best types; their knowledge of facts is always inadequate, their compromises are not always wise, and their selections are not adjusted continually to changing conditions. Possibly the most striking example just now of the insufficiency of the engineer's best efforts at foresight, is found in the unexpected and enormous spread of telephones, which compels the early abandonment of exchange equipments planned for long lives. Other examples are the persistent refusals, first on the part of the Bell companies and later on the part of the Independent companies, to adopt party lines. Even the provision of a central battery in the exchange, now accepted as the obvious and only rational construction, was strongly opposed by competent engineers. The distrust of automatic mechanism and the opinion which appears to be current that automatic trunking and automatic distribution of calls are unprofitable may in time prove to be unfounded.

The only substitute for natural selection of the best, from types naturally competing, is an exhaustive study and unprejudiced judgment of all structures which promise improvement or economy in any direction. Such research can be conducted only with great resources, and even then it calls for rare foresight and persistence. From these considerations it might seem that standardizing of appliances was safe and even necessary for an operating company with an established business, but undesirable for a new comer compelled to make his way on a showing of good reason for his existence.

A related disadvantage of standardizing appliances appears in the inertia of ideas and of plant, which result from limiting the types of appliances. The public, familiar with the use of only one form of instrument, may decline to use a different though better one; construction and maintenance forces familiar with one form will oppose, malign or even destroy strange appliances. It is a truism in telephony that the opinion of an operator cannot be accepted as to the deficiencies of familiar apparatus or the advantage of new apparatus.

The conservatisms of the public and of operatives can be overcome by education, however; the most serious inertia is that of the capitalist. Where a variety of appliances are used it is not difficult to show economies of one over the other; the results of their competing performances are manifest; and when the competing appliances are rivals it becomes a matter of life and death on the part of the owner of the less efficient to find a better machine. If only one type of appliance is under observation, the basis for adequate study is lacking; the advantages of improved apparatus are not apparent; decrease of profit is not so directly traceable to the need for an improved mechanism, and the motive for prompt replacement is lacking. Even though it be possible to show a theoretical saving in annual charge in favor of improved appliances, there will be no haste to make the change.

In determining upon standard appliances much, and often undue weight is given to the prevailing usage. Such usage sometimes will be found justified by the fact that the appliance is the survivor of many; but not rarely its wide use rests only upon conservatism or inertia. In examining the reason for existence of such usage, a study of its origin often will be enlightening. The conditions which produced it may be found to have disappeared or diminished in importance; or, as in a number of cases which might be named, mere thoughtlessness may have been responsible for its extensive use. An interesting example is the tubular drop, designed as a bridged clearing-out drop, but used almost universally as a line drop cut off during conversation. The costly construction was necessary for its limited use in the permanent bridge of the circuit; but it was needless in the more common use as a line drop. Similarly the bridging magneto was designed for multi-station lines; but its use became almost universal for lines where its costly winding of fine wire was unnecessary. Even now the sales of bridging bells are mainly of the costly sort adapted for extremely severe conditions of service, which only a small percentage of them are required to meet.

In so far as it is possible the selection of standard appliances should be based upon costs rather than prices. Prices of new and highly efficient or patented appliances are likely to have no fixed relation to costs. Thus, the adjustment of quality to costs of performance, may be entirely vitiated by unexpected and arbitrary changes in price.

While it is desirable that telephone systems in their present condition of partial development should be left reasonably free to improvement, the engineer should be on his guard against waiting for new developments. The structure produced to-day will develop faults to-morrow of a sort peculiar to itself. Existing and tried structures, perhaps with some trifling improvements, the effects of which are certain, should ordinarily be preferred to promising new ones.

One point remains to speak of, which is an important and not always tolerable factor affecting the uniformity of method and appliances in the telephone industry. This is personal interest. On the part of the manufacturer it appears in reluctance to modify his product, or to abandon an obsolete type. On the part of the engineer it often appears in his adherence to appliances of his own design. The inventor is notoriously a poor judge of his inventions. It is nearly always possible to make an appliance different and in the absence of adequate data to advance claims of improvement. The best example of telephone engineering practice in existence, which is also an example of the closest adherence to standard method and appliances, has been achieved almost wholly without invention on the part of the engineers who created the system. Their work has been confined to inspiring others to invent, and selecting the most desirable from the product.

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A Lockout Device for Central Energy Lines

By Arthur F. Poole.

ONE of the most marked features of telephone development in recent years is the steadily increasing popularity of the party line. As compared to a subscriber to a private line the party line subscriber is under three disadvantages: He is annoyed by his bells ringing when the call is for another party on his line; his conversation is not private, as any of the other parties on his line may cut in and listen to the conversation; and finally, he may find the line busy when he wishes to use it. The first two objections are the most serious ones. The third is of comparatively little importance, since the subscribers to a party line are as a rule in the residence district and have but few calls per day.

Most of the efforts to improve central energy party line service have been in the direction of giving a selective ring, or of ringing only the bell of the party wanted. This has been developed to such a point that for four party lines the several plans offered by the large Independent manufacturers leave but little to be desired; and if the party line business, present or prospective, warrants the exchange manager in going to the additional expense of the equipment, the disadvantage of a non-selective ring is a thing of the past.

To remedy the second disadvantage—that of the party line subscriber having only the good breeding of the other parties on his line to prevent their listening to his conversation—but few plans have been proposed. On the face of the matter it would seem that the removal of this second disadvantage was fully as important as the first.

The lockout device hereafter described was designed by the writer and has been tested to a limited extent in actual operation. As will be seen from the description, it is simple, has a wide margin for its operation and depends for this operation on conditions which are present in any central energy line, so the device will operate on any of the various circuits now in use. However, its chief merit is that it requires no additional operation by the central office operator, for whatever a central energy lockout will do there is one thing that it must not do, impose additional labor on the already overworked operator at a party line position.

Before describing this device, it will aid in the understanding of its operation to first consider the diagram in Fig. 1, which may be taken as a typical central energy circuit. In this is shown a line and cord circuit. For the sake of simplicity the cord circuit is shown without the listening and ringing keys and

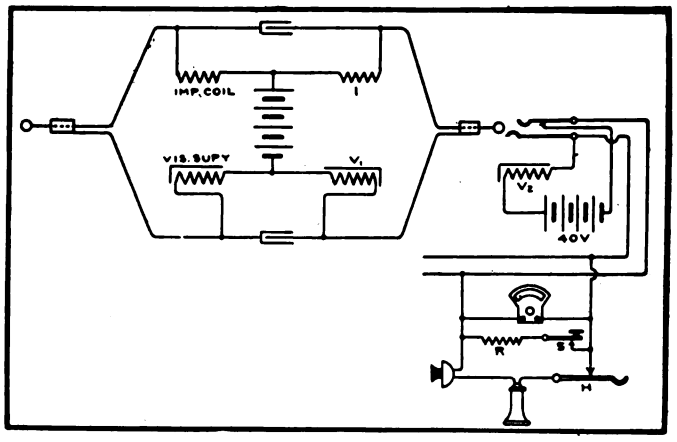

Fig. 1. Typical cord and line circuit, with voltmeter connected to show principle which determines the operation of lockout device.

with visual supervisory signals, while the line circuit is shown with a cut-off jack and a visual line signal. One station is shown with a voltmeter connected across the terminals of the telephone. A resistance "R" is also shown, adapted to be connected across the line by a switch. Suppose that the batteries supply lines and cords at 40 volts, and that the resistance "R" is equal to either the resistance of the line visual "V-2" or the sum of the resistance "V_1" and "I." When the hook switch is open the voltmeter will show 40 volts. Now close the switch "S," throwing the resistance "R" across the line. Since "R" is a resistance approximately equal to that of "V-2," and both of these are large compared to the line resistance, the voltmeter will now read 20 volts, approximately. Now close the hook switch "H," throwing the telephone set in bridge, the resistance of the telephone set being low compared with "V-2," practically all the fall of potential will be in "V-2" and the voltmeter will now read from 3 to 6 volts. Practically the same

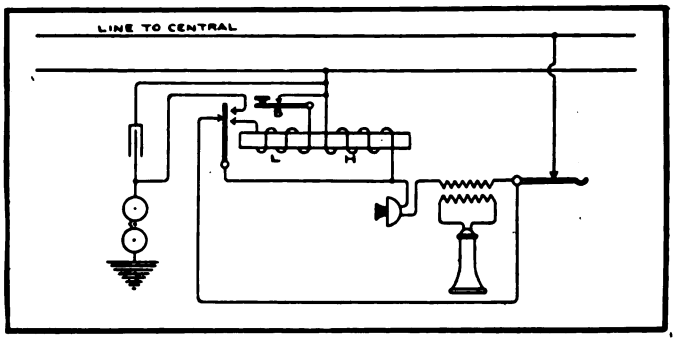

Fig. 2. Method of connecting lockout relay with high and low resistance windings in subscriber's set.

readings will be observed if the cord is in the jack for the resistance of "V-2" is equal to that of "V + I."

The operation of the lockout depends on these different voltage readings across the line, according to whether a high resistance or a low one is bridged across the lines. At each station on the party line a relay is provided having two windings, one of high and the other of low resistance. The object of the latter winding will be explained later. The telephone set at each station is normally inoperative, being shunted by the armature of the relay when it is against its back stop. The relay is so designed that it will take 10 volts across the high winding to pull up its armature and remove the shunt from the telephone set, thus making the transmitter and receiver operative. The operation of the lockout will now be readily seen. All stations on the party line are normally locked out. When one subscriber removes his receiver there is voltage enough across the line to operate the relay at his station and bridge his telephone set across the line. As soon as this is done the voltage between the lines falls to from 3 to 6 volts. A second subscriber removing the receiver at his station would not find voltage enough to operate the relay at his station, since the relay at his station requires 10 volts to operate and the line voltage has been reduced to below 6 volts by reason of the first subscriber being across the line. Consequently the second subscriber is locked out.

In Fig. 2 are shown the circuits of the relay and telephone set at a subscriber's station. A relay is provided having a high winding, "H," and a low winding, "L." The circuit of the high winding is open at the hook switch, and the telephone set is short circuited by the armature being against its back stop. When a subscriber takes his receiver from the hook he bridges the high coil "H" across the line. If no other subscriber is across the line the relay will pull up its armature. Besides removing the short circuit from the transmitter and receiver, thus making them operative, a circuit is completed through the low winding which, as will be seen, is in series with the transmitter. This low resistance coil is for the purpose of holding the relay armature after it has once been pulled up. If it were not used as soon as the transmitter had been thrown across the line, practically all the current would be taken from the high coil and it would require a nice adjustment to hold the armature with such a

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small current, so the low resistance coil is added and the armature is firmly held to its front stop. It will be observed that a second contact on the armature shunts the low coil with the condenser. This is for the purpose of removing the impedance of the low coil from the talking circuit.

So far it would seem that one party could not talk to another on the same line since when the first party came in he would put the line in condition that the second party would be locked out. The button "B" is provided to furnish means whereby the first calling subscriber can let the second one in. On asking central for the second party he is told to hold the button until he hears the second party answer. An inspection of Fig. 2 will show that the button "B" opens the low resistance path at the first station, this puts the voltage of the line to the value it had when the first party came in, so the second party has voltage enough to operate his relay and consequently gets in on the line. At the first station the condenser is across the break in the low coil so the subscriber there can hear the subscriber at the second station answer. As soon as he hears him answer he lets go the button and both parties are now in on the line.

It will be observed that the installation of the lockouts on a party line entails no additional apparatus whatever at the central station; the operation of the line and clearing out signals being the same as before. And it is only in the rare case of a subscriber wishing to talk to another on the same line that the operator at central has anything additional to do. In this event she has only to instruct the calling subscriber to press the button on his telephone and hold it in the depressed position until he hears the second party answer.

There is no limit to the number of stations which may be put on the same line; the apparatus works just the same on a party line of twenty as on one of two. As will be seen, it will work with any central energy switchboard circuit whatever, and, since its operation is purely electrical, it may be easily installed on telephones now in use. It will work on any selective ringing scheme, since the ringing circuit is not charged. The lockout device comes into circuit only after the hook switch has been raised.

THE TELEGRAPHIST'S AND TELEPHONIST'S NOTE BOOK.

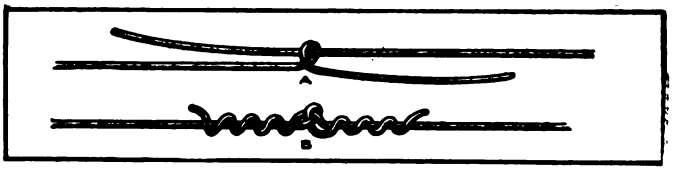
THIS book is reviewed in the London *Electrical Times* as follows: "The name of the author of this funny little book is not given. It contains much information, written for the most part in telegraph office slang, which we are not ashamed of being unable to interpret; we can only guess at its meaning, e. g., 'To prove currents, get R from the distant office, and upset the balance by withdrawing the 4,000 ohms plug from the rheostat (if no switches for the purpose),' etc.; or 'To insert capacity in a condenser, insert a plug,' which is intelligible, but sounds as though capacity were a plug. On more familiar matters there are some startling statements, thus: 'Carbon combined with oxygen gives carbonic acid, the same combined with gas gives carbonic acid gas.' Again: 'The unit of Force is called a dyne, it is that force which acting on unit mass for one second, gives it an acceleration of one second.' The author has a lofty contempt for theory, and labels with that word such things as the absolute zero of temperature. In one place he gives a very loose definition of the strength of field due to a current in a conductor, and concludes with the words, 'This theoretical definition is, of course, of no practical use.' We incline to agree with him. He seems to imagine that secondary cells are completely discharged before recharging, and he puts their efficiency at 90 per cent.; also his views on trigonometry, under the heading of 'Reckoning Angles,' are quaintly expressed. On the other hand there are some useful tables in the book, and a quantity of technical information which looks substantially right, though we would far rather live in ignorance of it than habitually use the language in which it is expressed."

As we are unfamiliar with the book in question this is reprinted without prejudice. The author who has inspired such an ingenious article as this can be content that he has done some good in the world, even if he has shot his technical statements a little beside the mark!

CERTIFICATES FOR REDUCED RATES FROM CHICAGO CONVENTION MUST BE PRESENTED ON JUNE 27 OR 28.

REDUCED rate certificates at the National-Interstate Convention must be presented for endorsement on June 27 or 28. All holders of certificates from ticket agents which will entitle them to obtain the return trip from the Chicago Convention at one-third the regular rates should bear in mind that these certificates must be visèed by the special agent of the railway companies who will be in attendance at the Convention. This agent will be in attendance on June 27 and 28. All holders of certificates should present them as early as possible to Mr. J. A. Harney, assistant secretary of the National-Interstate Telephone Association, at the Convention headquarters in the Auditorium Hotel for his endorsement. After they have been properly endorsed they will be visèed by the railway agent.

Holders of certificates leaving before the arrival of this official, or before one hundred certificates have been deposited with the assistant secretary, or who present certificates after the special agent's departure cannot take advantage of the reduced rates. Attention should therefore be given to these requirements, including the dates, which through an error, were incorrectly stated in the item relating to this matter published in our issue of last week.



Method of Tying Iron Wire Proposed by Charles Claydon. This Method Has Been Found to Give an Especially Good Joint on Rural Lines, Where There is Danger That Insecure Joints Will Be Made By Inexperienced Linemen.

ECONOMICAL TELEPHONE ACCOUNTING AND FILING SYSTEMS.

By Charles C. Wilmot.

(*Continued from Page* 357.)

Item L. Messenger service: After the necessary assurance is obtained that the amount of messenger service is correct, credit may be taken for such messenger service performed by agents.

Item M. Authorized expense: Number the vouchers enclosed, properly signed and approved.

Item N. Authorized rebates; Properly approved and included with the report.

Item O. Checks and cash orders enclosed for balance due the telephone company.

Item P. Amount of coupons enclosed.

Item Q. Cash or stamps enclosed.

Item R. Postage expense and money order or express fees paid.

Item S. Balance due company: This represents any balance due company not remitted with the regular monthly report. The total debit column must agree with the total credit column. This is important.

This Monthly Report must be forwarded to the general office of the telephone company on or before the 5th day of each month, covering the preceding month's toll business. A remittance for the cash balance shown on the monthly toll report must accompany the report in every instance. Remit by postoffice order, express money order, check or draft. Detach the original record of "out" business and "in" business, and forward the same promptly. The carbon copy of the report is to remain in the toll record book for reference in case of dispute. Always have the carbon sheet in the proper position so that a duplicate record will be made.

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THE EDITOR'S PAGE

EXTENDING THE CONVENTION'S INFLUENCE.

EVERY Independent manager who is doubtful of the future owes to his stockholders the duty of attending the Chicago convention in order that he may wisely judge how their interests may best be served. The seeking out of such hesitating neighbors and impressing upon them of the advantages to be gained by such a trip is no less a duty falling upon those who are firm in their convictions that the Independent telephone movement is assured of success and that the addition of each individual to the firm union which exists is beneficial alike to the new member and the whole body.

To the man who does not know the true extent of the great work in which the Independent telephone men of this country are engaged nothing can be a more valuable object lesson than a visit to the Convention of the National-Interstate Telephone Association. To-day the telephone manager is confronted by numerous difficulties. To many the very question of competition is at once the initial and most important subject of debate. The manager of a plant which is comparatively isolated from the stronger groups of Independent operators is subjected to a particularly severe pressure. Constant extension of facilities is demanded by the public which he serves, and as a condition of success this must be granted.

The method of securing the widest range of service desired must be determined. Extension of a single system beyond certain territorial limits is hindered by the difficulty of securing capital and the impossibility of deriving a profit from the operation of a plant when the amount and vigor of the efforts necessary to secure and retain business in a field occupied by numerous competitors are so immensely increased as they are by this procedure. Such expansion may only occur within recognizable limits.

Connection with the lines of other companies is therefore the only means for the extension of service and the question to be settled is with what lines such connections shall be made—Bell or Independent. If the manager could only be sure that connection with other Independent lines would make his plant a link in a chain which, while strengthened by his addition, would also contribute to his own power in the local field; one in which each member is increasing in value and influence more rapidly than its competing rival; and be satisfied that each of the powers with which he will be associated would justly observe the conditions which will enable and assist him to develop the territory he has pre-empted in such a way as to secure to him the most complete success and aid him most energetically to develop a profitable long distance business, insuring to him an absolutely just proportion of the profits accruing from such business—if he knew that such results could be obtained now or in the near future by connecting with the lines of other Independent companies, it is with these interests that he would ally himself. To learn whether or not these things are possible he must acquire knowledge from all sources, and at the National Convention he will be in touch with men from all over the country who can give him the information he desires. He will meet representatives from many districts who have confronted the difficulties he is facing, have made their decision, and will tell him the results.

Then there are so many smaller things about which he may be in doubt. How to most economically lay out and build his lines, secure the highest efficiency from labor, keep his accounts, develop rural business, even what constitutes good service—all these things he must know. There is no more economical guide, if judiciously followed, than the experience of others, and this experience will be available to every man who visits the convention.

Perhaps the greatest of all to see and most to his advantage to appreciate is the spirit of the Independent telephone men who will be assembled. This is the sentiment which has been communicated from one man to another, beginning with a few scattered individuals, until we now see a great body of men united in conducting a great industrial struggle. To appreciate that these men, each achieving success in his own community, are all bound together by the firm ties of a common knowledge, a common interest in the battle for Independent success and a common motive which leads all to "LOOK FOR THE SHIELD" as a badge of fellowship—that is the thing!

SHOULD SUBSCRIBERS OWN EXTENSION SETS?

THE question whether or not telephone instruments shall be knowingly sold to subscribers to the service of an operating company for connection to its lines as extension sets presents a rather broad opportunity for consideration by the manufacturers of such instruments. From a legal point of view, the right on the part of subscribers to connect their own instruments to the telephone company's lines and to use them in carrying on conversations with other subscribers has not been definitely overthrown by the courts of one of our largest cities. The matter seems, therefore, to be one strictly concerned with the principles of good business policy.

Some Independent telephone men who are familiar with the conditions in the city where the carrying of this question before the courts has resulted in wide publicity may say that anything which hurts the enemy should be tolerated. Others, on the contrary, who are fully as active in their efforts to promote the success of Independent operation, say that anything which facilitates such a connection injures the telephone business as a whole.

They call attention to the numerous disadvantages, the nature of which can readily be imagined by any practical telephone man, which may arise from the connection of instruments by inexperienced persons. These not only include such as may be due to electrical reasons, but, if the practice were widespread, would involve features capable of producing a considerable effect upon the operating efficiency and profits of a plant. For instance, it is admitted that the connection of extension sets on a line increases the average number of messages per day on that line, because it makes it easier for the subscriber to telephone. Now if all the subscribers to a system giving service on a flat rate basis were to buy and connect telephones the company would not only be subjected to a sensible diminution in future profits through the destruction of an undeveloped source of revenue, but would handle a considerably larger number of connections per day without a corresponding increase in receipts. As this increased load might properly be called abnormal it would not have been considered in any estimates the company might have made, and therefore would be especially inconvenient.

If those among the Independent operating men who have applauded the efforts of subscribers in one case to obtain extension set service in this manner were to consider the subject in the new light we have suggested and then ask themselves, "How far will this spread? Whose turn will come next?" they might be led to think that the subscriber who believes he is charged too much for his extension set service should be educated to correct his grievances in some other way.

The manufacturers, for their ultimate success, must depend upon the prosperity of the operating companies. Many, therefore, think it well worth while for all parties interested to get together and give this question proper consideration in order that if it contains dangerous possibilities it may not develop to a point where it will pass beyond control.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

INTERFERENCE BY STREET RAILWAY COMPANY AS ABUSE OF AUTHORITY.

The street railway system in our village has always been operated by steam, but the company owning it is now about to change the power to electricity. It has a franchise that seems to permit it to do these things. We are already established on the street, but the street railway company is putting up its wires in such a way that they short circuit our wires. Some places they overbuild us and in others underbuild, but in a great many places with both constructions their wires touch and rub up against ours so messages cannot be sent over our wires because the electric current is cut off. What can we do to protect ourselves? A. T. L.

YOUR REMEDY is to apply for an injunction to restrain the street railway company from interfering with your rights. The railway company is bound to so use its own property as not to interfere with the property of another. In so doing the railway company is abusing its authority and is subject to restraint. See Birmingham Traction Co. v. Southern Bell Telep. & Teleg. Co., 24 S. 731.

CONNECTION CONTRACT HELD EXCLUSIVE FOR INDIANA COMPANIES.

THE Home Telephone Company of Wabash, Ind., and the Eel River Valley Telephone Company of North Manchester have been defeated in important litigation in which the plaintiff was the North Manchester Telephone Company, all being Independent companies.

The North Manchester company, years ago, built a toll line from North Manchester to Wabash and entered into an agreement with the Home company of that city, whereby the latter was to grant exclusive right to the North Manchester company for handling toll messages from North Manchester and intermediate points to the Home company in Wabash. The Eel River Valley company demanded the same privilege from the Home company, and threatened to bring suit to enforce its demand. Over the protest of the North Manchester company equal rights were granted by the Home company to the Eel River Valley, which has most of the local telephones at North Manchester, and the North Manchester company brought an injunction suit.

The court decided that the contract of the Home company with the North Manchester was binding and exclusive, and that the Eel River company must be cut off by the Home company from all service over its Wabash lines. The Home company was also assessed $150 damages for giving the Eel River company service in violation of contract.

SETTING OF POLES CANNOT BE RESTRAINED BY ONE NOT PROPERTY OWNER.

AT Omaha, Neb., the Nebraska Telephone Company, after Judge Wheeler of the District Court had sustained the demurrer to the original suit brought in the name of S. B. Wadsworth, filed a new suit against the Independent Telephone Company to enjoin it from placing its poles on South Seventh street outside of what is asserted to be the curb line.

Judge Wheeler on the filing of the petition issued an order restraining the Independent company from proceeding further with the setting of its poles on the thoroughfare in controversy.

When the Independent company commenced placing its poles on Seventh street south of Sixteenth avenue in such a manner as, it was alleged, would interfere with the Nebraska Telephone Company, suit was brought in the name of S. B. Wadsworth, local attorney for the Nebraska company. The Independent company demurred on the grounds that Mr. Wadsworth was not personally interested as a property owner and the Court sustained the demurrer.

According to the petition of the Nebraska company the city engineer fixed the curb line at fourteen feet from the property line. Shortly afterward the Independent company began to set its poles along the street, but instead, it is alleged, of adhering to the curb line fixed by the city engineer, placed its poles exactly opposite those of the Nebraska company and sixteen feet from the curb line, leaving just two feet between the poles of the two companies. As the petition alleges, when the Nebraska company began to place the cross arms on its poles, it found it was unable to do so owing to the fact that the cross arms extend about five feet each side of the pole, while the poles of the Independent company are only two feet distant from those of the plaintiff company.

The Independent company alleges that the action of the Nebraska company is not in good faith, but merely brought to interfere with its business and hamper it as far as possible. The Independent company asserts that while there is no curbing at present on Seventh street south of Sixteenth avenue, the line has been established as sixteen feet from the property line and not at fourteen feet, as contended by the Nebraska company.

TEXAS COURT RULES THAT SUBPOENAS CANNOT BE SERVED BY TELEPHONE.

THE Court of Criminal Appeals at Austin, Tex., has held that a sheriff is not empowered to serve a subpoena on a witness in an arson case by means of a telephone, as it is a method too susceptible to error. The court further held that the serving of subpoenas, as contemplated by the statutes, should be done in person, as the surest means of identification is through personal view.

The case was that of ex-parte Burt Terrell brought up on appeal from McLennan county. Terrell had been fined and lodged in jail for contempt of court, for alleged ignoring of a subpoena to appear as a witness in the case of Ernest Ferguson, charged with arson. Terrell lived at Crawford, about twenty-five miles from Waco, and was summoned by the deputy sheriff by telephone and the subpoena read to him over the wire. When the case was called Terrell failed to appear. The trial was postponed and on its continuing Terrell was brought into court by a deputy who had been sent for him. On his appearance the court fined Terrell and sent him to jail for contempt. Terrell immediately swore out a writ of habeas corpus in the district court, which was carried up on application to the higher court. The Appellate Court in rendering the opinion discharged the applicant.

EJECTMENT AGAINST A TELEPHONE COMPANY.

IT has been held in the State of New York that where the plaintiff owned the fee, or title, in the highway, to the center thereof, and a telephone company had erected its poles in the highway without the permission of the plaintiff who owned adjoining property, the plaintiff might bring a suit to eject the defendant from the highway. The company in this case contended that a suit in ejectment was not the proper method to determine the question, but that the plaintiff should have brought a suit in equity, such as a suit for injunction, but this contention was overruled by the court. Little v. Am. Telep. & Teleg. Co., 8, N. Y., S. 136.

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IN THE OPERATING FIELD

INDEPENDENT TELEPHONE MEN OF THE SOUTHWESTERN DISTRICT OF IOWA HOLD A MEETING.

TELEPHONE interests of southwestern Iowa were well represented at a meeting of the southwestern Iowa district of the Iowa Independent Telephone Association recently held at Council Bluffs. No set program had been arranged and the meeting was quite informal.

In addition to a talk on various topics directly connected with the subject of meeting competition those present devoted some time to a discussion of the clearing house question, as applied particularly to a division of terminal charges between the Independent Telephone Company of Council Bluffs and its connections. The adjustment of this matter, however, was left to the clearing house officials at Des Moines.

A short business session was held for the election of officers and for the selection of a delegate and alternate to the National Convention of Independent companies, to be held at Chicago, June 26, 27 and 28. The officers remain as before: President, H. A. Kinney, Woodbine; secretary-treasurer, J. F. Glenn, Denison. Fred C. Musson of Atlantic was named as delegate to the National Convention, with H. A. Kinney of Woodbine as alternate.

Those present from outside of the district included P. C. Holdoegel of Rockwell City, president of the State association, and Charles C. Deering of Boone, the State secretary. The list of those in attendance follows: C. R. Benedict, D. C. Cooper, J. C. Mansfield, Shelby; A. J. Carter, Sioux City; H. A. Kinney, M. A. Reed, Woodbine; J. H. Jenks, M. Fretz, Avoca; E. C. Campbell, Persia; George Battey, Portsmouth; J. K. Alline, Chicago; George T. Hewes, Des Moines; W. H. Bryner, Vail; Phil Zerwas, Manning; P. J. Korth, Earling; C. H. Hallis, Hudson; George W. Sandy, Des Moines; C. H. Smith, Sioux City; J. F. Glen, Denison; P. C. Holdoegel, Rockwell City; Chas. C. Deering, Boone, and J. F. Mouren, Arion.

PROGRESSIVE RURAL COMPANY IN NEW YORK HAS GROWN RAPIDLY.

INAUGURATED in 1899 as a mutual system, the Delaware Valley Telephone Company, which has its headquarters at Deposit, N. Y., has extended its lines into all the neighboring towns and villages. Among other points reached are Stilesville, China, Hambletville, Canonsville, Trout Creek, Loomis, Sidney, Masonville, in Delaware county, and Coventry, Coventry Corners, Bainbridge, Bennettsville, Andrews Hill, in Chenango county, Sanford and North Sanford connections are also made from Deposit in Broome county, with over 2,000 subscribers in other exchanges. The company is owned and controlled exclusively by the farmers and business men in and between the towns mentioned.

TOPEKA COMPANY TO ERECT A NEW BUILDING FOR ITS OFFICES AND MAIN EXCHANGE.

TWENTY-FIVE thousand dollars will be expended by the Topeka, Kan., Independent Telephone Company in the erection of a new exchange building. Suitable property has been purchased and the work of construction will start at once. It is hoped that sufficient progress will have been made to enable the company to give service from its new exchange by November 1. There has been ordered a new central energy switchboard which will have a capacity much greater than that of the board at present in use.

Throughout the business portions of the city all the wires will be placed underground and in the suburban districts aerial cable will be installed. The Topeka company is growing with exceptional rapidity, as is shown by the fact that it was recently found necessary to issue a special directory supplement, containing the names of 800 new subscribers.

NEW ULM RURAL TELEPHONE COMPANY PROSPERS.

GRATIFICATION was expressed by all the stockholders of the New Ulm (Minn.), Rural Telephone Company at the report which was read at the annual meeting. Maintenance charges and costs of new construction necessitated an outlay of approximately $49,000, which left a balance of over $2,000 in the treasury. During the year several new lines were built and a new switchboard was installed. Officers elected for the coming year were Philip Liesch, president; Alex. Russell, vice president; L. G. Vogel, secretary, and Otto Schell, treasurer.

TRUNK LINES TO CONNECT LOS ANGELES WITH SAN FRANCISCO.

PLANS are now being made for the construction of two telephone lines by the Home Telephone Company to connect Los Angeles with San Francisco. One of the new lines will go north almost paralleling the Southern Pacific valley line, and the other line will be by way of the coast and will take in the most important cities en route.

The materials for the new exchange in San Francisco have already been ordered, and it is said that within the next eighteen months the lines will be in working order.

PEOPLE'S COMPANY, OF SWEDESBORO, N. J., SHOWS PROGRESS.

A MARKED increase in the business of the People's Rural Telephone Company, of Swedesboro, N. J., is shown in the May issue of its directory. Communication to new long distance points has been established and the list of subscribers has been increased by a gratifying number of new names. Service is now furnished direct to twenty-eight towns and villages and four exchanges are in operation. These are located at Mullica Hill, Mantua, Swedesboro and Woodstown.

Besides containing the list of subscribers a large amount of general advertising of local firms is included in the directory pages. The top and bottom of every page is set apart for this purpose and three cover pages are also utilized. The business of this company has grown at a remarkable rate from the very beginning, and its progress is such as to indicate that its patrons are very well pleased with the service furnished.

LONG COMMON BATTERY SUBSCRIBER'S LINE REPORTED IN SERVICE IN UTAH.

RECENTLY the Utah Independent Telephone Company cut into service at Eureka, Utah, an ordinary central energy telephone instrument, which is working directly on a line run into the exchange at Provo, which is forty-four miles distant. The instrument is said to be one of the standard telephones made by a leading manufacturer, connected on a No. 10 copper circuit, and supplied with battery at 40 volts. W. N. Winter, of the Provo exchange of the company which operates this long line states that there is nothing of a special nature in the apparatus used at the central office for the connection of this instrument. Included in the forty-four miles of line is one-half mile which passes through cable, and twenty-six miles are supported upon the Western Union Telegraph Company's poles. The balance of the line is of perfectly normal telephone construction. No induc-

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tion from the Western Union circuits is experienced, and in all respects the transmission and signalling are said to be satisfactory. The people who are using this line would seem to have a good claim for a record for long distance common battery operation.

INDEPENDENT SERVICE FOR MONTANA PROJECTED ON A LARGE SCALE.

TELEPHONE service for the entire state of Montana over Independent lines is the object which is in the minds of those who have organized the Montana Independent Telephone Company. This organization has recently been incorporated with a capital stock of $1,500,000, with headquarters located at Butte. Franchises have been secured in Butte and Anaconda. The company has arranged to take over some properties which are now in operation. In addition to the plants in these cities, the immediate building of exchanges in Helena, Missoula, Great Falls, Dillon and other points is contemplated.

The company will be allied with the Utah Independent Company and toll connections between the two will be made at Pocatello, Idaho. On the west toll lines from the Montana company will connect at Missoula with those of the Home Telephone Company, of Spokane. The long distance lines of the company will, for the present, be run to a considerable extent upon Western Union telegraph poles. This is a development of the contract between the Western Union Telegraph Company and the Utah Independent Telephone Company, which was secured some time ago by Elmer B. Jones, who is Managing Director of the Utah Company, and also of the new Montana company. Mr. Jones was also able to secure for his company privileges on the rights of way of the Rio Grande Western and Western Pacific Ry. Companies, which enable him to build to San Francisco and over all points on the Rio Grande system, so that the facilities for toll lines are in every way satisfactory.

Construction work has been commenced upon several of the plants under the supervision of T. S. Lane. The company has planned to erect substantial plants, and furnish the best service possible, and expects to have at least ten thousand telephones in operation in Montana within a year. The directors of the company are as follows: Andrew J. Davis, President First National Bank, Butte, Montana; S. M. Largey, President State Savings Bank, Butte, Montana; P. B. Moss, President First National Bank, Billings, Montana; Harry A. Gallwey, Manager Parrot Mining Company, Butte, Montana; Charles J. Kelley, Treasurer Hennesy Merc. Co., Butte, Montana; Con. J. Kelley, Attorney Anaconda Copper Company, Butte, Montana; Elmer B. Jones, Salt Lake City, Utah; Geo. T. O'Dell, Salt Lake City, Utah; H. B. Brown, Butte, Montana; Thaddeus S. Lane, Butte, Montana.

LARGE NUMBERS OF RURAL TELEPHONES BEING INSTALLED IN CANADIAN NORTHWEST.

THERE is no agency so powerful in the extension of the Canadian rural west as the telephone. In Manitoba, Alberta and Saskatchewan this fact is testified to daily, and most energetic efforts are being made in all portions of the prairie provinces to organize rural telephone systems. Unquestionably the refusal of the Bell company to co-operate with the promoters of these country districts has retarded the growth of the rural telephone idea, but of late it is making very substantial progress. The country weeklies of the new provinces are conducting very intelligent campaigns toward this end and the Alberta government has recognized this growing sentiment and has indicated a disposition to assist in the development of the rural telephone system on a large scale. This has stimulated the movement very generally in that province.

As an evidence of how the people of southern Alberta are deprived of the benefits of modern intercourse it may be mentioned that from Calgary south, through a thickly populated and wealthy portion of the province, there is no telephone connection. All along the border in British Columbia, Alberta and Saskatchewan the heavy dealers in hay report that they frequently lose large sales because of the superior telephone facilities of their competitors just across the line. There isolated farm houses are provided with telephones, and connections are made through the rural or neighboring lines directly with the big metropolitan exchanges. At all hours of the day produce merchants are in touch with the farmer miles away, and can order or countermand orders at a moment's notice. Thus deals are denied Canadians although their produce may be superior to that of the farmers just across the boundary.

This is merely the crudest form in which the Canadian farmer is at a disadvantage on account of the absence of telephones. Alberta farmers and ranchers are urging the use of rural telephones on the grounds that they minimize the danger from prairie fires which have destroyed so much property in the west during the past few years. In Alberta and Saskatchewan it is said that there are hundreds of opportunities for telephone companies to start business and they will receive every possible assistance from the government and municipalities with which they may do business.

The Blotter of Which This is a Duplicate in Reduced Size Was Designed and Issued by the Stephenson County Telephone Company, L. A. Herrick, Manager, Freeport, Ill.

JOHNSTOWN TELEPHONE COMPANY TO IMPROVE ITS SYSTEM.

IN accordance with plans outlined at its recent annual meeting, the Johnstown (Pa.) Telephone Company has broken ground for a new and modern telephone exchange.

The building will be a handsome one-story brick structure, and will contain besides the new switchboard, which is to have a capacity of 1,000 lines, the offices of the company.

The improvement when completed will have cost approximately $100,000. New underground conduits are to be installed and trunk service to the exchange at Moxham is to be improved by the addition of new circuits. Two new No. 10 copper toll lines are to be built from Seward to Lilly and two others from Johnstown to Hooversville. At present there are only five lines in service between the points named, so that sometimes a great congestion of traffic occurs on account of the heavy business. It is expected that the new circuits will enable the company to meet the demands for its service in a manner which will be very satisfactory to the public.

FIFTH INDIANA DISTRICT ASSOCIATION HOLDS MEETING.

REPRESENTATIVES from the fifth district of the Indiana Independent Telephone Association recently met in Muncie. This district embraces the Independent systems in Delaware, Madison, Tipton, Grant, Jay, Blackford, Randolph and Howard counties.

Among other important matters which came up for discussion was the selection of representatives for the National convention. J. A. Browne and H. G. Miller, of Winchester, were chosen.

Officers who will serve in this district for the ensuing term were elected as follows: President, J. A. Browne, Winchester; secretary-treasurer, S. O. Miller, Fairmount; delegates to State convention, A. L. Johnson, Thomas Bromley, jr., Muncie; O. H. Barnhill, Winchester; H. O. Miller, Fairmount; J. A. Browne, Winchester; F. D. Russling, Daleville; O. L. Barger, Converse; D. Mount, Tipton, and Frank White, Portland.

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QUERIES

POTENTIAL DIFFERENCES FOR OPERATING TRANSMITTER.—(701.)

Will you kindly tell me what would be the difference of potential between points A and B in the attached diagram? J. W. N.

The diagram evidently is a portion of the circuit used in a Bell intercommunicating system. As it is impossible to give an answer which would have any practical value from the circuit as furnished, it is shown completed in the diagram at the right of Fig. 701. In the diagram as furnished by you the circuit is open, and the potential at points A and B would be the same as that at the terminals of the battery, namely 20 volts. As soon as the subscriber takes the telephone off the hook, however, the circuit is completed through the retardation coil which is between the instrument and the battery, and a current flows through the coils. The ordinary phenomenon of a drop which is in proporion to the resistance takes place in each division of the circuit.

Assuming, for the sake of obtaining a definite basis for figuring, that the resistance of the receiver is 80 ohms; that of the transmitter 60 ohms; and the line between the retardation coil and the retardation coil to the subscriber's station is 2 ohms, you would have a total resistance in the circuit of 80+60+2+170 ohms, the latter figure representing the resistance of both windings of the retardation coils. The drop throughout the entire circuit is, of course, 20 volts, and neglecting the portion of this drop which is confined to the part of the circuit between the battery and the terminals of the retardation coils, due to the very small resistance in leads from the battery to these coils, it is found that the drop through the coils is $^{170}/_{312}$ of the drop in potential throughout the entire circuit. This gives somewhere in the neighborhood of 10.8 volts, leaving a balance of 9.2 volts, which would be the difference of potential between the points A and B with the circuit closed. This would be the electro motive force available for operating the transmitter, which we presume is the object of your query. There are so many variable quantities, such as the variable resistance of the transmitter, and that introduced by lines of different lengths, that a more practical method to employ than calculation is direct measurement with a voltmeter. If general figures are desired a number of measurements can be taken, under different practical conditions, and the average of these results taken as the desired figure.

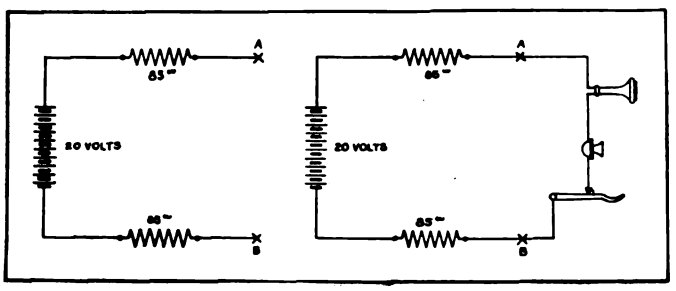

Fig. 701.

FORMULA FOR JOINT RESISTANCE OF TWO CONDUCTORS.—(702.)

Will you kindly explain to me how the formula for joint resistance of two conductors is derived? R. N.

This formula, as usually stated, is that the resistance of a pair of conductors connected in parallel is equal to the reciprocal of the sum of the reciprocals of their separate resistances.

This result is derived from the equation, $\frac{1}{R}=\frac{1}{A}+\frac{1}{B}$ Where R equals the joint resistance of the pair, A equals the resistance of one conductor, and B equals the resistance of the other conductor. The derivation of this expression is very readily understood when it is borne in mind that experiments have shown that the conductivity of a group of conductors joined in multiple is equal to the sum of the conductivities of each of the members of the group. Furthermore, the conductivity may be mathematically expressed as the reciprocal of the resistance; that is to say, if the resistance of a given wire is 10 its conductivity is 1/10; therefore since the sum of the conductivities of the separate wires is equal to the conductivity of the circuit formed by them when united, and the conductivity is the reciprocal of the resistance, the derivation of the above formula is obvious.

Now, to take an example, suppose it is required to find the joint resstance where A equals 2 ohms and B equals 4 ohms.

We have $\frac{1}{R}=\frac{1}{2}+\frac{1}{4}$, or $\frac{1}{R}=\frac{3}{4}$ Then the conductivity is equal to ¾ of an ohm, and therefore R=4/3 ohm. In practice these results are obtained by a modification of formula 1, obtained as follows: $\frac{1}{R}=\frac{1}{A}+\frac{1}{B}=\frac{B+A}{AB}$ Therefore $R=\frac{AB}{B+A}$

Another way of stating this is that the joint resistance is equal to the product of the resistance of the separate conductors divided by their sum.

CONNECTING A 110 VOLT CIRCUIT TO A WARNER POLE CHANGER.—(703.)

Is it practical to connect a 110-volt direct-current to a Warner Pole Changer? I tried it, but there was a spark at the contact springs which melted off the platinum contacts; otherwise, it worked all right. Pease give me instructions as to how I should make proper connections. G. T. M.

A 110 volt direct current may be connected to the terminals of a Warner pole changer, but resistance should be employed. This resistance should, of course, be non-inductive, and the most suitable form is an ordinary electric light lamp. This may be connected between one of the contacts of the pole changer and lighting mains. The spark you mention is due to the fact that the current is too strong, and its heating effect is therefore high. You are very likely in using this excessive current to experience other difficulties, and resistance should be inserted as soon as possible.

RETARDATION COIL IN CORD CIRCUIT.—(704.)

Will you kindly explain why a retardation coil can take the place of a repeating coil in a subscriber's cord circuit? How is it known how much retardation the coil should have? J. F.

A retardation coil is used between battery and cord strands in order that current may be supplied to subscriber's transmitter, while alternating voice currents which pass over the line from his instrument will not be short circuited through the battery, which is of low resistance, but will pass beyond the battery and out over the line of the second subscriber with whom connection has been established. The retardation coil permits the passage of the direct current to the transmitter, but owing to the fact that its effective resistance or impedance to an alternating current is much higher than that which it presents to a direct current, the path across the cord circuits through the two windings of the retardation coil and battery has an extremely high resistance for alternating currents of the frequency set up in conversation. These currents, therefore, pass with the slightest imaginable diminution, due to shunting, from one line to the other.

One of the important factors which determines the dimensions of the retardation coil is that the number of windings and size of the iron core must be such that sufficient impedance to currents of the usual frequency for talking and ringing will be offered to prevent the passage through battery as above stated. As many frequencies are employed a compromise giving the best value for all has to be struck, and the proper development of these coils is the result rather of experiments than of calculations.

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TELEPHONE PATENTS

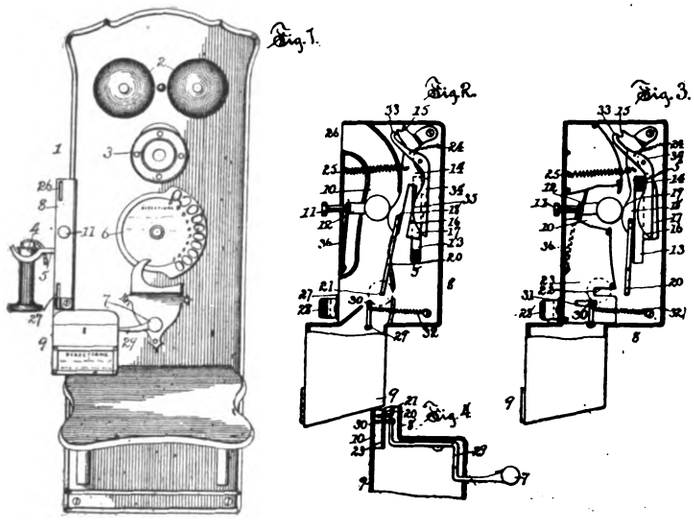
CONDUIT.

Daniel H. Murphy, Milwaukee, Wis., patents (No. 817,086; dated April 3, 1906; filed June 9, 1902; serial No. 110,719) and assigns to the Safety Armorite Conduit Co., Pittsburg, Pa., a conduit for electric wires.

The essential feature of this invention consists in electroplating the exterior surface of a conduit pipe with zinc, and coating its interior with an elastic insulating enamel which, it is claimed, will not crack.

TOLL APPARATUS.

George A. Long, Hartford, Conn., patents (No. 815,107; dated March 13, 1906; filed March 11, 1903; serial No. 147,260) and assigns to the Gray Telephone Pay Station Company, Hartford,



Conn., an automatic coin collector for automatic telephone systems.

The object of this invention is to provide a toll collecting apparatus which may be used in connection with automatic telephone systems.

Referring to the accompanying illustrations 8 is a case mounted on the side of the cabinet and through which the hook switch 5 passes. One leg 17 of a slotted locking lever 14, pivoted within the case, closes the hook opening and prevents the upward movement of that device under normal conditions. A plunger 12, held in position by spring 36, penetrates one wall of the coin chute 26. Attached to the locking lever is a finger 20, having an inturned end 21, working in a slot 22 in the plate 23, which forms a side to the chute channel. Projecting through slot 31 in plate 23 is a detent 30 which is carried by a lever 29 connected to the ringing button 7. Associated with the locking lever is a latch lever 34 having a latch 33, which when in use engages the catch 15 of the locking lever.

The operation of the device is as follows: When a party wishes to use the telephone he deposits in the chute 26 a coin which lodges between the leg 18 of the locking lever and the plunger 12. The plunger 12 is then depressed and the movement communicated through the coin to the locking lever, forcing its leg17 away from the hook switch slot, and causing its catch 15 to engage with the latch 33. When the plunger is allowed to return to its normal position, the coin falls to the bottom of the chute and comes to rest upon the detent 30. The receiver is then removed from the hook which moves to its highest point (see 5 in Fig. 3) and the connection dial is manipulated. If the subscriber discovers, by listening, that the line wanted is not engaged, he depresses the ringing button 7 which causes the withdrawal of the detent 30, and the coin falls into the money box. Should the line be busy, however, the receiver is replaced on the hook, moving it downwards, thereby unlatching the locking lever, which under the action of the spring 25 moves sharply to the left; the end 21 of the finger 20 then throws the coin into the receiving clip 28, from which it may be recovered by the subscriber.

AUTOMATIC TELEPHONE CONNECTOR SWITCH.

A. E. Keith, John Erickson and C. J. Erickson, of Chicago, Ill., patent (No. 815,176; dated March 13, 1906; filed April 21, 1905; serial No. 256,804) and assign to the Automatic Electric Company, Chicago, Ill., an automatic telephone connector switch.

This patent relates to automatic apparatus employed at an exchange to connect one subscriber's line to another.

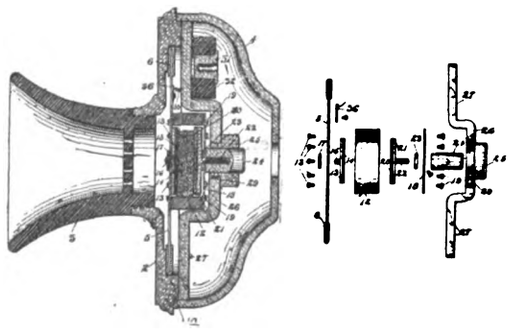
As the specifications require eight sheets of drawings and fifty-one different diagrams, it will be impossible to give a clear analysis of the claims involved. All persons interested should procure a copy for their personal investigations.

TRANSMITTER.

W. W. Dean, Chicago, Ill., patents (No. 817,140; dated April 3, 1906; original application filed January 27, 1902; serial No. 91,456; divided and this application filed April 3, 1902; serial No. 101,149) and assigns to the Kellogg Switchboard and Supply Company, Chicago, Ill., a telephone transmitter.

The essential feature of this invention consists in the mounting of the granular carbon chamber upon the front electrode.

Referring to the illustrations 5 is the diaphragm to which is attached a hard rubber ring 12 by screws 13. The front electrode 14 is fastened to a plate 15 having a threaded extension for its attachment to the diaphragm. The rear opening of the ring 12 is closed by a supplemental diaphragm 18, which is attached thereto by screws 19. The rear electrode is mounted on a plate 24, having a threaded extension 22 which passes through the diaphragm 18 and is attached to the stem 24, which in turn is rigidly fastened to the bridge 27. In operation, vibrations projected



against the main diaphragm 5 cause variations in the resistance of the granular material between the two electrodes in the usual manner; but the containing chamber being attached to and vibrating with the front diaphragm, the carbon particles are continually disturbed and are therefore not so susceptible to packing.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

NEW DEAN BRANCH EXCHANGE.

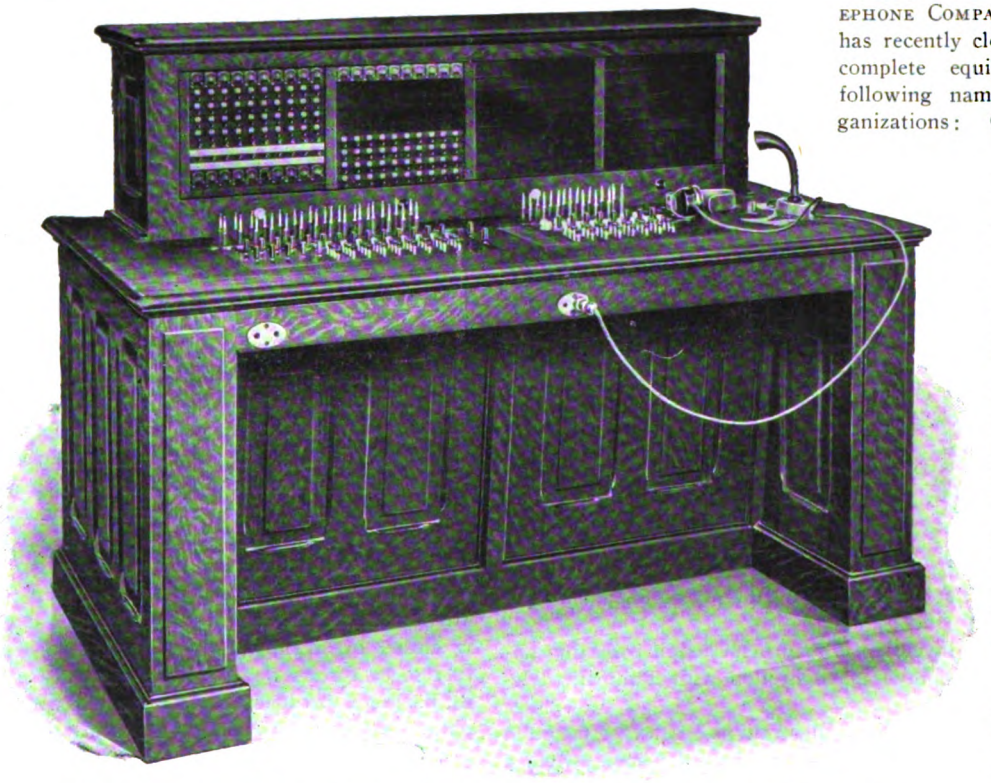
A STYLE of switchboard which is particularly adapted for extremely rapid operation, and so designed and finished as to present a very neat appearance, has recently been brought out by the Dean Electric Company, Elyria, Ohio. It is a two-position common battery board for private branch exchanges or central offices which have less than 300 lines, and is known as the No. 16 type.

The cabinet is furnished in best quarter-sawed oak or solid mahogany as desired. Both front and rear panels are removable by releasing the flush ring catches which hold them in place, this construction making access to all the apparatus a very simple matter. The key shelves are made five ply, with the grain of the wood of alternate layers laid across in different directions so as to prevent warping. They are hinged, and held in place by a very substantial spring lock thus allowing the wiring to be readily inspected, but only by an authorized person.

Space is provided on the key shelf for the installation of a 4-party line combined ringing and listening key which can be cut into each cord circuit if desired.

The plug shelf is covered with one-eighth inch polished leather to prevent noise in operating and wear on the cords and plugs.

The key for switching the hand and power generators is conveniently located on the key shelf, at the right of each operator, and is so arranged that only one generator, either hand or power, can be connected at any one time. The hand generator for each position is mounted in the rear of the cabinet with an extension shaft projecting to the front through an escutcheon to the crank as shown in the view, thereby making it readily accessible as well as convenient for operating.



The New Dean No. 16 Type Switchboard for Private Branch Exchanges or Small Central Offices.

The switch controlling the night alarm bell is wired to ring whenever a line or supervisory relay is operated. Line and supervisory signal pilot lamps are provided at each position.

The operator's breast plate transmitter set shown in this view consists of the well-known Dean long distance type transmitter and receiver, with a hard glazed cotton cord connecting to a plug. This plug when in service is inserted in one side of the operator's twin jack shown in the space below the keyboard. This jack is so constructed that when the plug is withdrawn the operator's circuit is automatically opened. This type of talking circuit has become very popular on account of its great convenience and reliability.

The line relays can be mounted if necessary in the rear of the cabinet, but they are more convenient for inspection and less liable to damage when being shipped, if arranged to be mounted on a separate rack outside of the switchboard.

All wiring on this switchboard is brought down by means of specially formed cables to the connecting racks contained in the rear of the cabinet, and to these connecting racks are led all line wires. The construction is such that the connecting rack is readily accessible at any time without interfering in any way with the mechanism of the switchboard. The equipment in this cabinet is the same as used on the larger Dean multiple switchboard, and which has proven to be so successful. The company states that this switchboard was designed to fulfill the most exacting requirements for switchboards of this size, and it will be pleased to forward detailed information to those sending a request.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., has recently closed contracts for complete equipment with the following named telephone organizations: Ovid Telephone Company, Shepardsville, Mich.; Inter-State Telephone Company, Wilsonville, Nebr.; Tedrow Telephone Company, Tedrow, Ohio; Lago Independent Telephone Company, Lago, Ind.; Farmers' Mutual Telephone Company, Ft. Seneca, Ohio; Farmers' Mutual Telephone Co., White Pigeon, Mich.

THE WESTERN TELEPHONE MANUFACTURING COMPANY, Chicago, Ill., is issuing catalogue E which describes at length the different pieces of apparatus it manufactures. The construction of the Western transmitter, receiver, ringer, generator, induction coil and switch hook is very thoroughly illustrated and each particular is carefully analyzed. Amongst the different types of wall and desk sets, descriptions of which find a place in this catalogue, there are several which embrace new ideas in the design and arrangement of parts. The "Pioneer" instrument conforms in appearance to the common battery wall type, but as this telephone is arranged for magneto service the generator is mounted in the cabinet below the writing shelf. Two distinct types of desk stands are shown. The "Western" Adjustaphone provides a convenient arrangement for desk instruments. In the compilation of this catalogue great care has been exercised to make the text and illustrations clear and distinct. All points of special interest are given greater emphasis by being printed in red. Copies will be furnished all persons who request them.

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GRAY PAY STATIONS PAY GRAY

THEY ARE AUTOMATIC

GRAY TELEPHONE PAY STA. CO. HARTFORD CONN

LARGE CATALOGUE 1906

THE STATION CAN'T BE IMPROVED SO WE IMPROVED THE PICTURE

YOU SIMPLY DROP THE COIN

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—Prices and description of intercommunicating apparatus to work in connection with common battery exchange service. Must be high grade and work on the button principle. Address Beaumont Telephone Company, Beaumont, Texas. 622

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Competent man (married preferred), who is thoroughly capable of handling both business and practical end of telephone plant operating 500 common battery and 200 rural lines. New plant. Position permanent to right party. Salary $65.00 per month for the first year. Right party can secure stock interest in property and the position of Secretary. Address, with full particulars, to Box 619, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 619

POSITION wanted with a manufacturing company in the advertising or sales departments, by a young man with energy, experience and ability. No reasonable offer refused provided there is opportunity for advancement. Address Box 613, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 613

WANTED—First-class telephone installers. Also man accustomed to wiring branch exchanges. None but competent men need apply. Good wages and permanent position. Address P. K. Higgins, Gen. Del., Milwaukee, Wis. 621

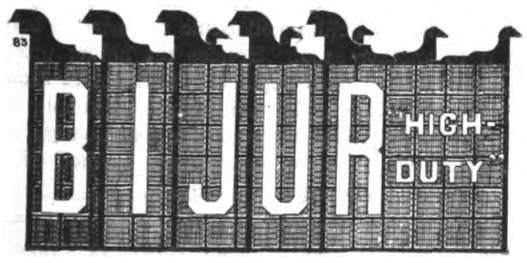
WANTED—A young gentleman of good appearance desires position as traveling salesman with good telephone or supply house. Seven years' experience, last four years as superintendent of switchboards for company operating over sixty exchanges. Can give best of references and reasons for wishing a change. Address Box 620, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 620

WANTED—Experienced purchasing agent desires position with progressive operating or manufacturing company. Good habits, clean record, excellent references. Address Box 623, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 623

MR. MANUFACTURER, our business is to create and delevop A MARKET FOR YOUR PRODUCT. We can sell your entire output at less expense and risk that you can do it. If you have a good thing but don't know how and where to sell it, write us. Hapgoods Sales Company, 305-309 Broadway, New York, U. S. A. Offices in eight American cities and London, England. 464

YOUNG MAN possessing experience and ability desires position as manager with a progressive company. Would be willing to consider a proposal offering part interest in return for services. Address Box 612, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 612

WANTED—Several young men to plan telephone toll line and cable construction. Preference will be given to men with good electrical educations. The work is located in the western part of Pennsylvania. Necessary expenses paid when out of town. No applications considered unless age and salary expected are stated. Address Box 618, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 618



This battery is distinguished by the fact that the grills are made separately and then welded by a process discovered by Mr. Bijur into a solid framework of either alloy or pure lead; the former being generally employed on account of its greater mechanical stability and oxidizable properties. These grills, while rigidly held in the frame, can expand in all directions, and therefore do not set up strains and so avoid the tendency to grow, burst, or buckle, which has heretofore been a well known disadvantage of many other types.

GENERAL STORAGE BATTERY CO.

GENERAL OFFICES: 42 BROADWAY, N. Y. WORKS: BOONTON, N. J.

BOSTON CHICAGO CLEVELAND SAN FRANCISCO WASHINGTON, D. C. MEXICO CITY

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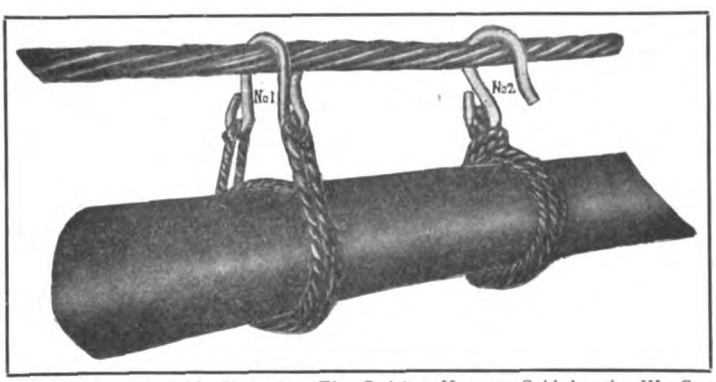
IN THE MANUFACTURING FIELD

PRACTICAL POINTS IN CABLE HANGING.

DESCRIBING the Swisher Marline Cable Hanger in a letter to the W. G. Nagel Electric Company, of Toledo, Ohio, its inventor, who is an experienced construction man, expresses some interesting views.

An illustration of this type of hanger is shown, and reference to it will make clear the point of his arguments. In this figure No. 1 represents the Swisher hanger, and No. 2 the open hook type. The inventor's letter states that with the latter style of hanger, after pulling the messenger wires as taut as they should be, the expansion of the messenger wires and the cables which they support is frequently not in the same proportion. This causes the cable to buckle and become unhooked, and the only way to prevent this is by closing each hook with a pair of connectors. This is an operation which takes time, and causes considerable annoyance to the men who do the work. The misfortune of having several strands of cable lying in the street, as the result of a few hooks becoming detached and the rest of the hooks stripping or straightening out, is alluded to as an experience which can readily be avoided. The operation of moving cable often makes it necessary to send a man out on the messenger and open up the hooks; then after the cable has been moved to the required position a man has to be again sent back to close the hooks. When this has been attended to it is likely to be found that after the cable has been up a few months the wind in blowing in a direction at right angles to that of the line will cause the marline to wear in the eye of the hook instead of allowing the hooks to swing on the messenger wire. Another difficulty mentioned is that caused by the sagging of aerial wires, which when being strung are allowed to drop until they are beneath the cable and on being pulled up become locked between the hooks and the messenger wire. This means either the sending of a man out on the messenger to unfasten them, or else the cutting of the wire at the nearest pole and pulling the span out to be strung over again.



Two Types of Cable Hangers. The Swisher Hanger, Sold by the W. G. Nagel Electric Company, is Shown at the Left.

To overcome these difficulties the type of hanger illustrated at the left of the photograph was devised. The hooks are all made of one size, both as to width and wire. The shape of the hanger is such as to enable it to bear a very great strain in proportion to its size. These hangers are galvanized after leaving the machine which brings them into the required form. In this way the danger of breaking the surface and forming a spot liable to rust when contact is made with a messenger wire is avoided. For supporting twenty-five and fifty pair cables the very best grade of marline is furnished; for the larger sizes the best grade of houseline. This is the same grade of marline and houseline as is used on sailing vessels, and is said to be more durable than even the poles which support the cable. The W. G. Nagel Company will be glad to send out prices, and descriptive matter which gives further information about this interesting type of hanger.

THE EDWARDS-HINE COMPANY, 5 and 7 Pearl street, Grand Rapids, Mich., has issued a folder which describes an extremely useful type of loose leaf binder. It allows the loose sheets to be arranged in substantial covers, which have, to all intents and purposes, the appearance of a regular bound volume. There are no pieces of metal work showing on the outside, to present an unsightly appearance or scratch a well-polished desk. The book is made upon a new plan which secures several important advantages. The binding is flexible, so that the leaves will lie flat no matter where the book is opened, and only a half-inch binding margin is required. The backs are made interchangeable in order that the number of leaves may be increased as desired. The Edwards-Hine Company claims that this book is a money saver and a time saver, and will be glad to furnish illustrations and descriptions to those who forward inquiries.

THE GOULD STORAGE BATTERY COMPANY, which had its San Francisco offices in the Crossley Building, which was destroyed by fire, has established temporary offices at 1701 Geary street, San Francisco. All inquiries relative to its products from Pacific coast patrons should be forwarded to the new address.

THE VOUGHT BERGER COMPANY, La Crosse, Wis., has recently increased its capital stock from $57,000 to $200,000. For some time the company's sales of telephone supplies have been increasing very rapidly, and in order to handle the large business which has been developed the stockholders decided to increase the capital stock.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, BUFFALO, N. Y., is mailing a card which draws attention to a number of very interesting features embodied in its No. 85 local battery desk telephone. This instrument is of the type in which the induction coil is mounted in the base. Amongst the statements upon the card are several drawing attention to various points in the construction of the stand which will appeal to practical telephone men, such as the ease with which the spring contacts and connections may be inspected, the fact that all connections are soldered and terminated in binding posts to which cords connect, and the attractive proportions and design of the stand itself. The company is anxious to have interested people learn more about this set, and wishes to send one of the instruments to any telephone manager who is about to purchase equipment of this sort.

THE FISK-NEWHALL TELEPHONE MANUFACTURING COMPANY, CHICAGO, ILL., has designed the Fi-Ne coil holder which is adapted for use in conjunction with its Fi-Ne coil winders. This piece of apparatus is intended to hold a coil while the wire is being unwound from it to another spool. Besides the holder proper three chucks are included in the equipment. This device should be very useful for rewinding coils as it affords a simple and efficient support for those being unwound for examination and repairs. A leaflet showing the construction and method of attachment will be mailed on receipt of a request.

THE ELECTRIC GOODS MANUFACTURING COMPANY, BOSTON, MASS., is mailing a card which draws attention to two types of flush telephones for interior service. These instruments set flush with the wall, the transmitter, bell, and receiver hook being mounted on the front. They are specially designed for house, apartment, or hotel use and are furnished in brush brass which gives them a very attractive appearance. Wiring diagrams are furnished upon request.

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Guaranteed to double the life of poles with proper application. Comes ready for use, anyone may apply it with a brush or by dipping; no skill nor machinery required.

Enables substitution of cheaper grades for expensive poles.

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NEWLY INCORPORATED

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How to Open Your Books and How to Keep Them?

We are equipped to render valuable expert assistance to any Telephone Co., large or small, who may desire to have a complete labor and money saving Accounting and Filing System installed.

Write for Our Special Telephone Booklet and Circular

N.B.—Be sure and advise us quite fully of the size and extent of your Exchange or System? Whether you own or operate your own Long Distance Lines or handle business on commissions. DO-IT-TO-DAY. We can help You!

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Telephone Systematizing Department

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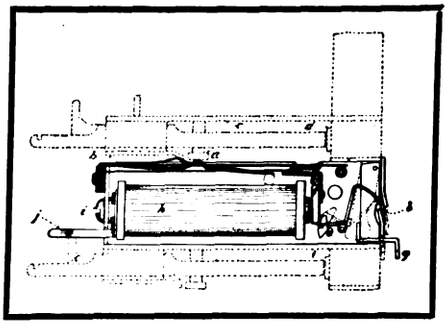

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A drop with 2 moving parts, the armature and shutter. When armature "F" releases shutter "E" the shutter falls through slot and gives signal to the operator. Compare this arrangement with the usual heavy brass shutter latched up by a brass rod like a farm gate, and you will see WHY the Unitype is more sensitive and positive in action. No pivot screws. Armature and shutter both supported on rods which run entirely across drop case. No adjustment ever necessary. Positive night bell contacts. Shutter always protected and can't be shaken down. Occupies small space and gives no trouble.

Let us tell you more about it.

THE SUMTER TELEPHONE MFG. CO. SUMTER, S. C.

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THE WEEK'S MESSAGES

NEW COMPANIES.

CHICAGO, ILL.—The Manufacturers' Telephone Company has been organized at Chicago, and has applied for a charter. The capitalization is nominally $5,000, but provision has been made for increasing the company's capital at any time it is deemed expedient. The incorporators are Laverne W. Noyes, president Aermotor Company; John E. Wilder, of Wilder & Company; C. H. Smith, president Western Wheeled Scraper Company; Gustav Hessery, Jr., treasurer National Brewing Company, and John M. Glenn, secretary Illinois Manufacturers' Association.

MILLSTADT, ILL.—The West Side Telephone Company, of Millstadt, has been incorporated with a capital stock of $1,140. The incorporators are William Kropp, Jacob Fischer and G. A. Mueller.

GREENFIELD, IND.—The Central Telephone Company, of Greenfield, has been incorporated. Incorporators are L. J. Weber, Andrew Williams and T. H. Scudder.

NOBLESVILLE, IND.—The Hamilton County Telephone Company has been organized with Fletcher Jessup, of Hortonville, as president. The company will have its main headquarters at Noblesville and Sheridan, and will install exchanges at Hortonville, Eagletown and other places.

MASON CITY, IOWA.—The Southwest Mason Farmers' Telephone Company has been organized, with Will Hamlin as president, and W. E. Roberts as secretary.

EDNA, KAN.—The Deer Creek Telephone Company has been organized with the following officers: John Newbury, president; H. W. Burgess, secretary; Wash. Pearson, treasurer. The company's line as soon as completed will connect with the Edna Mutual Exchange.

RAMONA, KAS.—The Ramona Farmers Mutual Telephone Company has been incorporated with a capital stock of $3,000.

VINTON, KAS.—The Vinton & Cameron Mutual Telephone Association has been incorporated with the following officers: G. W. Williams, president; A. Gilstrap, secretary, and E. T. Payne, treasurer. The company will build a line from Vinton to Arkansas City.

BOSTON, MASS.—The Metropolitan Home Telephone Company has been organized with Warren N. Akers as president. The company has applied for a franchise to construct and operate a telephone system in Boston.

CHAPIN, MICH.—The Chapin Mutual Telephone Company, Chapin, Mich., has been incorporated with a capital stock of $1,000.

HARRISVILLE, MICH.—H. F. Barber, manager of the Mutual Telephone Company, of Alpena, is interested in the formation of an Independent telephone company at Harrisville, which will build rural lines to Mikado, Killmaster, Lincoln, Mud Lake and other places.

HOUGHTON LAKE, MICH. — The Loxley Telephone Company, Houghton Lake, Mich., has been incorporated with a capital stock of $1,000.

BIRCH TREE, MO.—The Shannon County Telephone Company, of Birch Tree, Mo., has been incorporated with a capital stock of $10,000. The incorporators are John McClelian, W. I. Marshall, J. W. Chilton and others.

BENNET, NEB.—The Farmers' Mutual Telephone Company, of Bennet, has been incorporated with a capital stock of $10,000. The incorporators are W. F. Torbitt, M. Meyers, John T. Dobbs, Harry Honnor and Everett W. Randall.

LINWOOD, NEB.—The Linwood Telephone Company has been incorporated with a capital stock of $15,000. The incorporators are A. A. Hayek, D. G. Dawson, Frank Faytinger, Thomas Duda, W. F. Dawson, M. J. Rezac, Chas. Homolka, Fred Faytinger and Emil Eolda.

PRATTSVILLE, N. Y.—The Prattsville and Lexington Telephone Company has been incorporated with a capital stock of $600. The incorporators are J. Packham, B. G. Morse, G. D. Roppleyea, Prattsville, N. Y.

TRIANGLE, N. Y.—The Triangle Telephone Company, Triangle, N. Y., has been incorporated with a capital stock of $1,000. The directors are C. B. Self, DeWitt Beardsley, C. E. Adams, Triangle.

BARLOW, N. D.—The Farmers' Mutual Telephone Company, Barlow, N. D., has been incorporated with a capital stock of $10,000. The inporators are J. R. Tingberg, John Indegard, L. Mortenson, E. H. Weigman, G. M. Carlson, G. G. Schmid, Barlow.

CONSIDINE, N. D.—A new Farmers' Telephone Company is being organized at Considine, in which Ben Jones and others are interested.

WAHPETON, N. D.—The Home Telephone Company, of Wahpeton, N. D., has been incorporated with a capital stock of $10,000. The incorporators are Robert H. Divine, Geo. E. Wallace and W. L. Carter, of Wahpeton.

PARKLAND, OKLA.—The Star Rural Telephone Company, of Parkland, has ben incorporated with a capital stock of $10,000. The incorporators are Henry Rowland, J. E. Switzer and D. L. Lamb, of Parkland; G. W. Braden, of Chandler, and Frank George, of Agra.

MONTGOMERY'S FERRY, PA.—J. P. Aiken, of Lewistown, traffic manager of the United Telephone Company, is interested in the formation of a new telephone company, which is to run from Montgomerys Ferry to Newport, connecting with the exchange at that point, and continuing down through New Buffalo, Duncannon and Marysville, connecting at Enola with the Harrisburg exchange.

CENTERVILLE, S. D.—The Citizens Telephone Company, of Centerville, has been incorporated with a capital stock of $50,000. It will construct both local and long distance lines. The incorporators are J. A. Crowe, T. J. Gunderson, C. M. Morgan, Geo. H. Lowrie and E. Mudie.

COLMAN, S. D.—The Farmers' Union Telephone Company, of Colman, has been incorporated with a capital stock of $9,000. The incorporators are A. S. Harvey, Andrew Ulstad and Ole Mickkelson.

LEBANON, S. D.—The Springs Mutual Telephone Company, with headquarters at Lebanon, has been incorporated with a capital stock of $5,000. The incorporators are John Nold, O. W. Beach, Jos. Tilgen and C. L. Keller.

OTTWAY, TENN.—The Ottway Telephone Company has been incorporated with a capital stock of $320. The incorporators are W. H. Smith, J. O. Young, Jacob Wiloughby, R. A. Bromley, W. W. and J. M. Casteel.

CAMERON, W. VA.—The United Farmers Telephone Company, of Cameron, has been incorporated with a capital stock of $10,000. The incorporators are T. R. Chapman, McCracken, Pa.; Gus Leichter, J. C. Lough and A. B. Barnett, Rock Lick, W. Va., and John Hagerman, Cameron.

SOLON SPRINGS, WIS.—An Independent telephone company is being formed at Solon Springs by local business men. The company expects to make connections with the Douglas County long distance line.

LARAMIE, WYO.—The Little Laramie Telephone Company, with general offices at Laramie, has been incorporated with a capital stock of $10,500. The company is to build a line from a point about twenty-five miles west of Laramie, on the Little Laramie River, to Laramie. The incorporators are John W. Ernest, W. C. Vance, Howard R. Ingham, Ollie Wallis and S. F. Phillips.

TORONTO, ONT., CAN.—The Independent Long Distance Telephone Company has been incorporated, and expects to spend $200,000 in construction work during the coming year.

FRANCHISES.

PAPILLION, NEB.—The Home Telephone Company has been granted a franchise at Papillion, Neb.

WEST POINT, NEB.—The Independent Telephone Company, doing business around Beemer and Wisner, is to petition the West Point City Council to be allowed to establish an exchange at West Point.

BATHGATE, N. D.—F. E. Carson has been granted a franchise to construct a telephone system in Bathgate.

BALTIMORE, OHIO.—The Baltimore & Venice Telephone & Telegraph Company has made application for permission to extend its service from Shandon to New Haven, to Harrison, Miami and Cleves.

PORTLAND, ORE.—The Home Telephone & Telegraph Company, of Portland, has applied for a franchise at Astoria.

WARWICK, R. I.—The Home Telephone Company, formerly the New England Shaver Telephone Company, of Providence, has been granted permission to construct a telephone system at Warwick.

ALBEE, S. D.—The Grant County Telephone Company has been granted a franchise for a telephone system in Albee.

FRANKLIN, TENN.—The Home Telephone Company, of Nashville, has been granted a franchise at Franklin.

COLVILLE, WASH.—Geo. K. Armstrong and others of Echo have applied for permission to construct a telephone line from Colville to Echo.

TRIADELPHIA, W. VA.—The National Telephone Company, of Wheeling, W. Va., has applied to the city council of Triadelphia for a franchise to construct and operate a telephone system in that city.

FINANCIAL.

BLAKELY, GA.—The Blakely Telephone Company has recently paid its third annual dividend. This year the dividend on the common stock was at the rate of 6 per cent., and about 4 per cent. was carried to the surplus.

MULBERRY GROVE, ILL.—The Mutual Telephone Company, of Mulberry Grove, Ill., has increased its capital stock from $1,000 to $5,000.

CAPE GIRARDEAU, MO.—The Cape Girardeau Bell Telephone Company has increased its capital stock to $125,000.

MEDINA, OHIO.—The Medina County Farmers Telephone Company, Medina, Ohio, has increased its capital stock from $10,000 to $25,000.

STANTONVILLE, TENN.—The Stantonville Telephone Company has increased its capital stock to $100,000.

COMBINATIONS.

RIPPEY, IOWA.—The Green County Telephone Company has been acquired by Messrs. Amos Burk, Chas. Stotes, John Munson and John Shoemaker.

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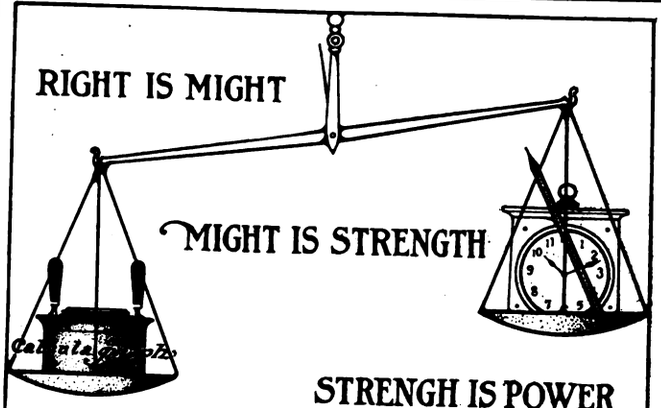

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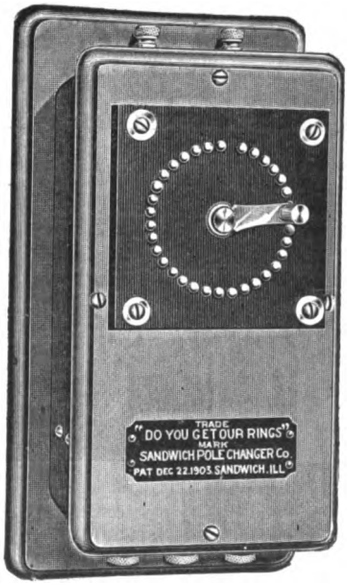

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THE WEEK'S MESSAGES

TECUMSEH, NEB.—The Johnson County Home Telephone Company, the new Independent Company at Tecumseh, has acquired the holdings of the Johnson County Telephone Company, formerly owned by H. F. Canon, of Cook. The Canon lines include the exchanges at Cook and Graf.

LITTLE FALLS, N. Y.—The Interstate Telephone Company is to take over the line formerly known as the County Telephone Company.

BERWICK, PA.—The Berwick Telephone Company has been sold to the Consolidated Telephone Company.

IOLA, WIS.—The Johnson Telephone Exchange has been absorbed by the Scandinavia line.

TWO RIVERS, WIS.—Geo. Martin has bought the interest of J. E. Hamilton in the local telephone exchange, and will make extensions in the system.

ELECTIONS.

ALBUQUERQUE, N. M.—The Mutual Automatic Telephone Company has elected the following officers: D. K. B. Sellers, president; A. E. Walker, vice president; Frank McKee, treasurer; F. A. Storrs, secretary.

ALBANY, N. Y.—The Albany Home Telephone Company has elected the following directors: James Moore, Henry Dumary, W. H. Keeler, Albert Hessberg, E. B. Toedt, Howard Hendrickson, E. M. Woodward, H. H. Bender, Richard Stephens, S. R. Rawson, I. H. Griswold, T. M. Brush, F. H. Sudro, W. E. Brooks and E. E. Williams.

PERSONAL.

F. N. BARHYDT has recently assumed the management of the plant of the Coles County Telephone and Telegraph Company at Charleston, Ill.

J. C. CALHOUN has been appointed manager of the exchange of the Mississippi Valley Telephone Company at Ft. Madison, Ia.

HARRY CRANDALL, of Toledo, has taken a position with the Union Telephone Company at Laingsburg, Mich., as superintendent of construction.

CLARENCE G. KERN, of Owensboro, Ky., has been appointed to the position of superintendent of construction for the Evansville district by the Cumberland Telephone and Telegraph Company.

FRANK LATHROP, who has been general manager of the Ozark Bell Telephone Company at Springfield, has been assigned to Hannibal as manager of District No. 3 of the Missouri and Kansas Telephone Company. His territory embraces the counties of Macon, Shelby, Marion, Randolph, Monroe, Rails, Audrain and Pike.

FRANK B. MOXHAM has been appointed plant supervisor of the Frederick district of the Chesapeake and Potomac Telephone Company, with headquarters at Frederick, Md.

WALTER N. NICHOLSON has been appointed general manager of the Central New York and the Empire State Telephone Companies.

W. V. RAMSEY, who has been manager of the Central Union exchange at Chenoa, has been advanced to the managership of the office at Petersburg, Ill.

JOHN RICHMOND has been appointed general manager of the Farmers' Telephone Company at Scribner, Neb.

F. B. ROGERS, who has for several years been general superintendent of the New York and Pennsylvania Telephone and Telegraph Company, has been promoted to the position of general manager.

H. F. STEVENS has resigned from the office of general manager of the Central New York, the Empire State and the New York and Pennsylvania Bell Telephone companies and has been elected to the vice-presidency of the Hudson River Bell Telephone Company, the duties of which position he will enter upon forthwith. Mr. Stevens will continue to hold the office of vice-president of the other companies mentioned.

WALTER I. SWEET has been appointed manager of the Jersey City district of the New York and New Jersey Telephone Company. This district includes Jersey City, Bayonne, Hoboken, Englewood and all of Bergen County, N. J.

CHARLES G. VICKERY, of Rochester, N. Y., has taken the management of the Salt Lake City plant of the Utah Independent Telephone Company, with the title of General Superintendent.

MISCELLANEOUS.

REGINA, SASK, CANADA.—The provincial government is preparing an act which will enable towns and municipalities to expropriate any Bell company's lines in the province. Address Walter Scott, Minister of Public Works, Regina.

ROSTHERN, SASK., CAN.—The town has sent a committee to visit various municipal telephone systems with a view to having a municipal telephone plant installed at Rosthern. Address John Hamm, Mayor.

New Construction in the Field

FOWLER, CAL.—The Fowler Independent Telephone Company expects to build a line to Oleander.

EMMET, IDAHO.—The Independent Telephone Company is installing an exchange at Emmett, and is also extending its lines.

MACOUPIN, ILL.—The Macoupin Telephone Company, which has lately acquired the Girard Telephone Line, running from Elkville to McVey, is going to greatly improve and extend the system.

COLUMBIA CITY, IND.—The Farmers Mutual Telephone Company is to build a number of rural lines.

COLUMBUS, IND.—The Citizens Telephone Company is considering the installation of a new exchange at East Columbus.

DALEVILLE, IND.—The Daleville Telephone Company contemplates making many extensions to its lines.

ROANOKE, IND.—The Roanoke Telephone Company is building two new rural lines west of Aboite.

SOUTH WHITLEY, IND.—The Whitley County Farmers' Mutual Telephone Company is to extend its lines to Jefferson township and to Roanoke.

CEDAR FALLS, IOWA.—The Corn Belt Telephone Company is to expend $15,000 in improving its system at Cedar Falls.

MAQUOKETA, IOWA.—The Maquoketa Telephone Company is rebuilding some of its lines.

MURPHY, IOWA.—The Murphy Mutual Telephone Company is to build a number of new lines.

SLOAN, IOWA.—The New State Telephone Company is constructing a line from Sloan to Sioux City.

HOWARD, KAS.—The Elk County Telephone Company is to build a number of county lines.

WESTMORELAND, KAS.—The Westmoreland Telephone Company will establish an exchange at Wheaton.

WHITEWATER, KAS.—The Whitewater Telephone Company is constructing telephone lines at Whitewater.

RINGGOLD, LA.—Messrs. Crump and Adkins are to install a telephone exchange at Ringgold, La.

CASCO, ME.—The Casco and Naples Telephone Company is extending its lines in various directions.

ETNA, ME.—The Etna Telephone Company is building a line from South Etna to Plymouth.

MARSHALL, MICH.—The Citizens Telephone Company is rebuilding its lines from Marshall to Eckford.

CROOKSTON, MINN.—The Tri-State Telephone Company is building a line from Crookston to Greenbush.

NELSON, MINN.—The Nelson Telephone Company is about to establish long distance connections.

OSSEO, MINN.—The Rural Telephone Company is to construct lines to St. Michael, Rogers and Hamel, and contemplates establishing an exchange at Buffalo.

ST. JAMES, MINN.—The St. James Telephone Company is building a rural line from St. James to Godahl.

ST. PETER, MINN.—The Nicollet County Telephone Company is building several new lines.

ROSEAU, MINN.—The Roseau Telephone Company is putting up an up-to-date telephone exchange at Roseau with all metallic lines.

DILLON, MONT.—The Southern Montana Telephone Company is to build a line to Poindexter Corner and will make extensions in the Big Hole Basin.

MILFORD, N. J.—The Delaware Valley Telephone Company will build a line from Milford to Frenchtown.

COHOES, N. Y.—The Cohoes & Waterford Home Telephone Company is to build lines from Scanlon's Corners to Dunsbach Ferry.

FREDONIA, N. Y.—The Home Telephone Company is extending its lines to Lily Dale and Cassadaga.

CARDINGTON, OHIO.—The Cardington Telephone Company is preparing to make many improvements in its system, including the installation of a new switchboard.

ALLENTOWN, PA.—The Consolidated Telephone Company is making many improvements in its system.

FACTORYVILLE, PA.—The Merchants' Telephone Company is building a line through Factoryville.

KUTZTOWN, PA.—The Kutztown Rural Telephone Company is to build a line from Kutztown to Kempton.

NEW CASTLE, PA.—The Union Telephone Company, of New Castle, is to build a rural line through to Pulaski.

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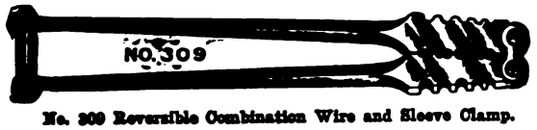

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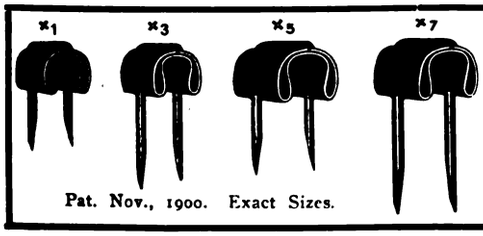

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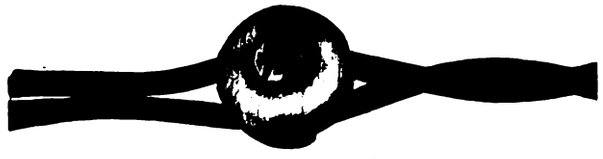
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Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognised as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

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Main Office and Works, Waverly Park, NEWARK, N. J.
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CONSULTING AND CONTRACTING TELEPHONE ENGINEER
Plans and Specifications for Complete Telephone Equipments. Existing Plants Remodelled.
Private Branch Exchanges Installed. Engineer for
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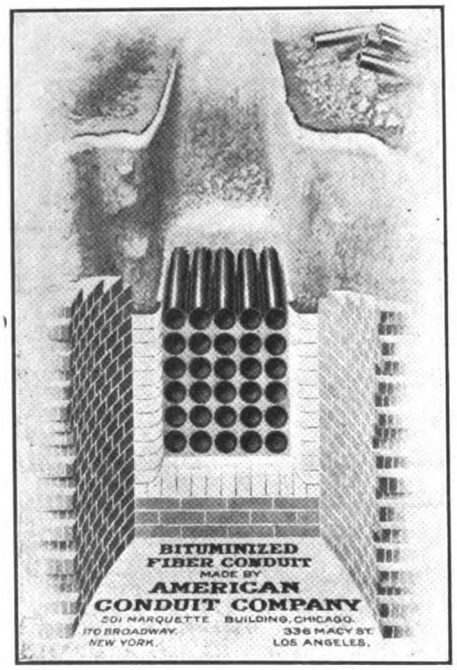
ENGINEERS : CONSTRUCTORS
Telephone and Telegraph Properties
MONADNOCK BLOCK — CHICAGO



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HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
—MADE IN THREE GRADES—
"EXTRA BEST BEST" (E.B.B.). "BEST, BEST" (B.B.). "STEEL"
INDIANA STEEL & WIRE CO. MUNCIE, INDIANA

Do you always mention the AMERICAN TELEPHONE JOURNAL when writing to advertisers? It will be appreciated by all concerned if you do.

WATERING a lawn once won't keep it green the rest of the year. Advertising once won't make any noticeable difference in the annual profits.—*Judicious Advertising.*

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The Celebrated
DONNELLY CLIMBER
is made of the toughest and best steel obtainable. It is guaranteed not to break. You can trust your life to it with perfect safety.
The Donnelly climber is now made exclusively by
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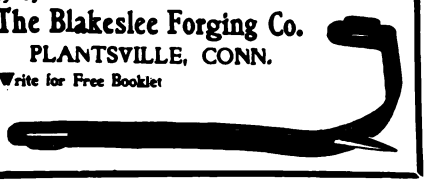

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Especially Designed For
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Blanks, Books and Forms for Telephone Exchange and Toll Line Bookkeeping and Accounting.
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Write for Sample Forms and Prices.
THE TELEPHONE PRINTING CO.
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Experts in Underground Conduit Subway Construction
THE BUTTERFIELD CONSTRUCTION CO.,
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Specialties in Celluloid for Telephone Companies, Instruction Cards, Name Plates, Etc., for use on Transmitters or Coin Boxes
WRITE FOR SAMPLES

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Eaco Steel Switchboard Cords

WE would like to send you samples of our Eaco Steel Cord, because it is made right and will overcome the difficulties so often found in cords. ¶Samples and quotations on request.

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CHICAGO
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Telephone Manufacturers

DALLAS
NEW ORLEANS

Gould

REPEAT ORDERS.

Nearly four years ago a prominent telephone company placed its first order for a Gould Storage Battery. The installation proved so completely satisfactory that six additional exchanges of this company were subsequently equipped with Gould Batteries. Frequent repeat orders like these from telephone companies throughout the country are *proof positive* of the satisfaction and economy of the Gould Storage Battery.

Full particulars and prices upon request.

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DOUBLEDAY-HILL ELECTRIC CO.

MANUFACTURERS AND DEALERS

TELEPHONE MATERIAL

Pittsburg, - Pennsylvania

Wire
Cross Arms
Pins

Brackets
Insulators
Connectors

Lightning Arresters
Fuses, Telephones,
Braces, Bolts, etc.

Highest Grade

Lowest Prices

Quickest Delivery

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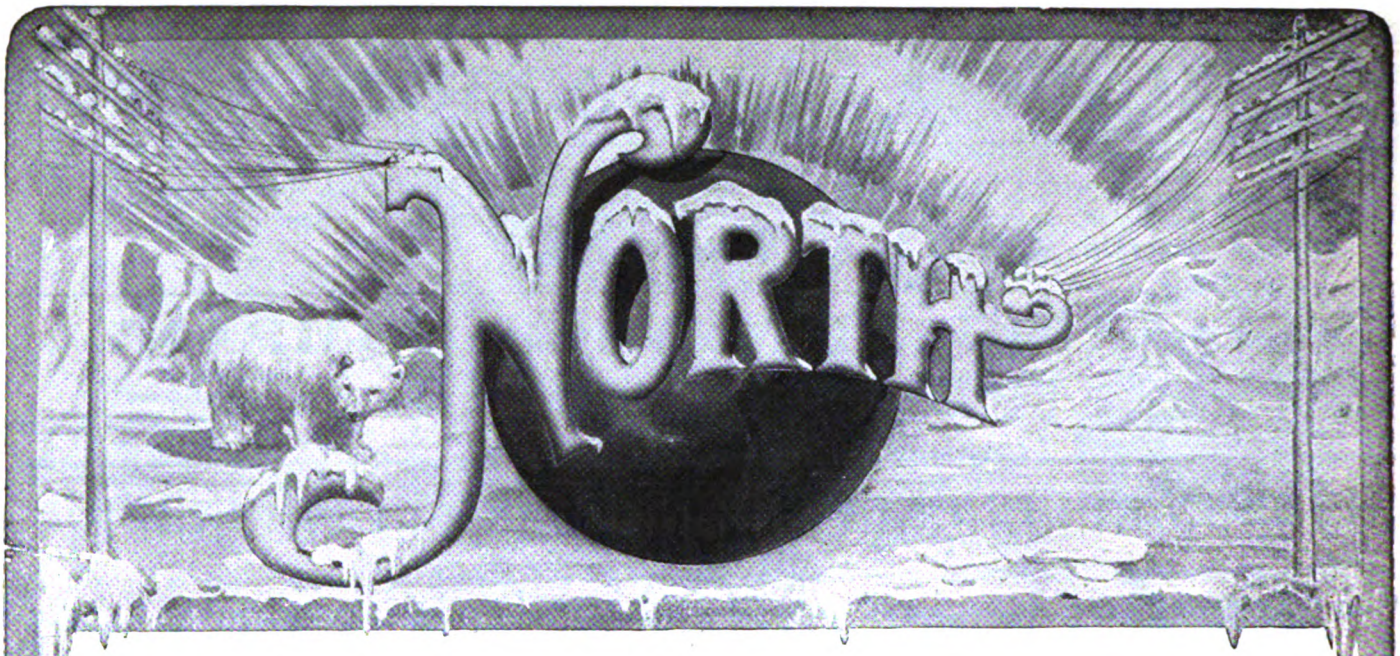

OUR KANSAS CITY BRANCH

Is now open for business. The Warehouse and Salesrooms are located at

317-319 South West Boulevard

Where we will carry a complete stock of Telephones, Switchboards, Construction Material, Tools and Miscellaneous Supplies.

We will continue our Warehouse and Salesrooms at

DALLAS, TEXAS

and will carry a complete stock as heretofore.

The establishment of the Kansas City Branch is to take care of the rapid increase of our business in that territory and to enable us to make deliveries more quickly.

Business East of the Mississippi River will be handled as heretofore from Cleveland.

KANSAS CITY CLEVELAND DALLAS

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO

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CENTURY
100% GOOD

ART IS LOVE'S BY-PRODUCT

MAGNETO CALL TELEPHONES as manufactured by us are the acme of the telephone art.

BECAUSE WE are lovers of PERFECT SERVICE.

PERFECT SERVICE means satisfied subscribers and more of them, larger dividends and more enjoyment out of life.

BUT perfect service is obtainable only with perfect telephones and apparatus.

CENTURY TELEPHONES are electrically and mechanically perfect.

WE WANT the opportunity of proving this to YOU.

LET US SEND YOU ONE

OUR LINE OF MAGNETO AND COMMON BATTERY EQUIPMENT IS COMPLETE

Get our Bulletin No. 14. Free on request.

CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

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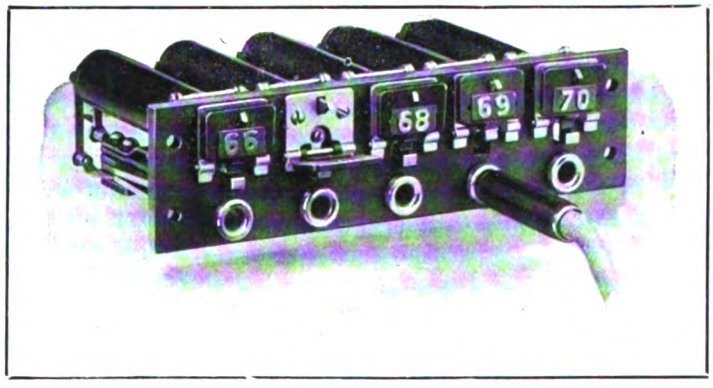
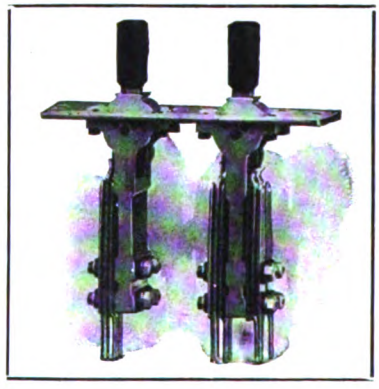
MONARCH

THE two most important parts of the switchboard being the line signal and the ringing and listening key, we illustrate a strip of Monarch drops and jacks and a Monarch ringing and listening key with ring back. These parts have now been on the market for a period of two years, and during that time they have proven themselves to be most efficient and durable. The fact that the armature of the drop is mounted in front of the coil and that the coil can be removed without breaking any soldered connections and without disturbing the armature is a feature that is appreciated by all practical telephone men. The additional advantage secured from this construction is that the adjustment of the armature is positive and permanent.





The ringing and listening key shows the same careful consideration of small details which is so apparent in all Monarch equipment. The mountings for the springs are solid brass so formed as to afford a most substantial support. The springs themselves are made of German silver and the contacts are pure platinum rivets. Little features of this kind will interest anyone in the market for switchboard equipment and an investigation will pay.

A complete exhibit of Monarch Telephones and Switchboards will be found in Room 642 and 644 during the National Interstate Telephone Association Convention, June 25th, 27th and 28th.

Monarch Telephone Mfg. Co.
CHICAGO, U.S.A.

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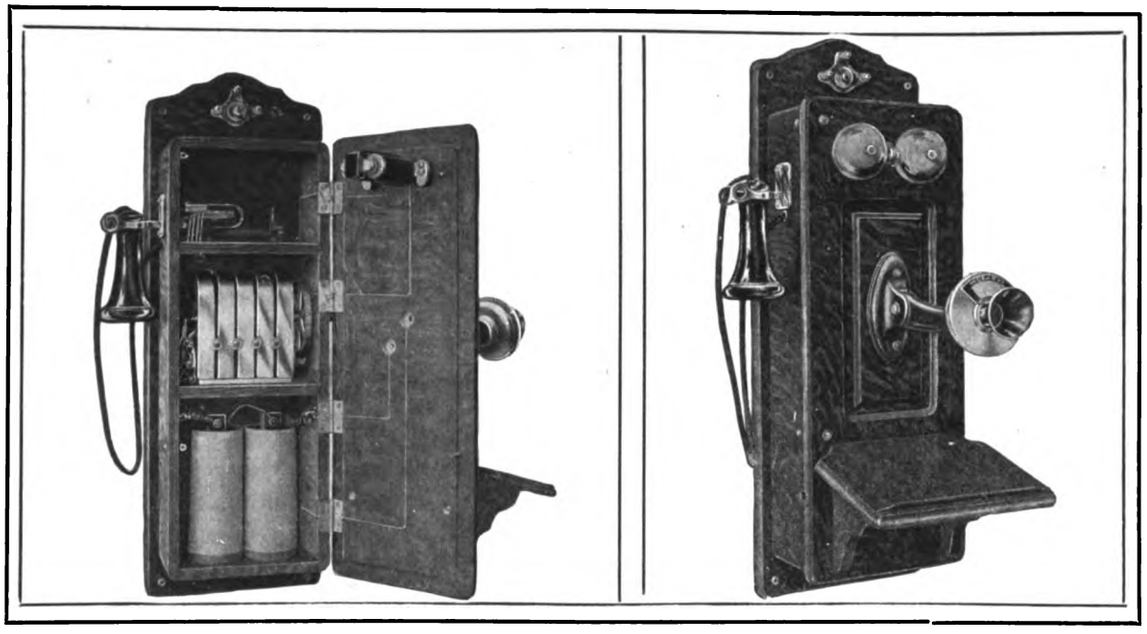
DEAN TELEPHONE APPARATUS

Selecting a Telephone



The selecting of telephones at first may seem to be a difficult problem, on account of the variety of telephones offered for sale and the advantages claimed for each class by the manufacturer, which tend to confuse at first, rather than enlighten the novice who does not consider the real efficiency, reliability and facility of repair, condensation of space in storage, non-breakable part of switch lever hooks, metal bushed mounting holes in corner of back-boards to prevent splitting or marring of woodwork, locks which will not fall out when the cabinet lid is open, and above all transmitters and receivers that have withstood the most severe tests and give the best results for all long distance transmission. When you have considered these points you will do as others have done by placing your contract for Dean telephones.

Our Bulletin No. 101-A gives complete description of our local battery telephones, which is yours by writing.

BRANCH OFFICES

511 Kansas City Life Building
Kansas City, Mo.

542 Byrne Building
Los Angeles, Calif.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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KELLOGG PHILOSOPHY— —THE BEST IS THE CHEAPEST

KELLOGG

FREQUENCY POLE CHANGER

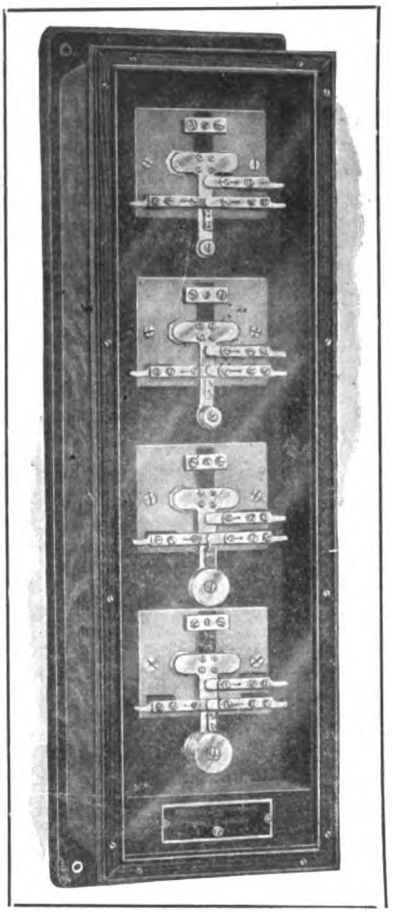
Utmost SIMPLICITY of Operation

THE EFFICIENCY

and beauty of the Selective Harmonic Ringing System of the Kellogg Company has been fully recognized by the entire Independent field, but the difficulty, heretofore, has been that the system required a generating device which involved a rather high first cost, and a relatively large consumption of energy.

The Frequency Pole Changer was designed to meet and overcome all these objections.

It is a very simple device, each unit only involving the use of a magnetic coil and three sets of springs.



"FRONT VIEW"—COVER ON

ADVANTAGES

1. Requires very little attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
5. Operates successfully on any standard voltage of a telephone exchange.
6. Practically noiseless in operation.
7. Only THREE contacts on each vibrator.
8. The vibrators have a very long spring, hence they will not break or change the frequency.

This Pole Changer can be used on either Common Battery or Magneto Exchanges

Send for Folder No. 3 **Correspondence Solicited**

KELLOGG SWITCHBOARD & SUPPLY CO.

CONGRESS AND GREEN STS., CHICAGO, ILL.

BRANCH OFFICES:

PHILADELPHIA, Keystone Tel. Building **CLEVELAND, Electric Building**

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Have You Seen Our New Anchor

equipped with two sets of blades at right angles to each other. This anchor is immovable by any direct strain when once set.

It is installed by Driving and Twisting, the same as the earlier type.

This anchor is especially fitted for hard and stony ground and can be set in one-tenth the time required for any other type.

Write for New Catalogue

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

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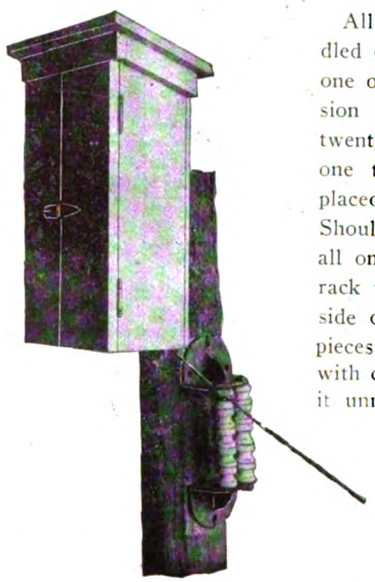
Robinson Pole Distribution Rack

(PATENT PENDING)

SIMPLE INEXPENSIVE PRACTICAL



All drops can be easily handled either by placing rack on one or both sides as the occasion demands. In case of twenty drops equally divided, one ten pair rack would be placed on each side of pole. Should the twenty drops be all on one side, a twenty pair rack would be placed on that side of pole. Top and lower pieces heavy malleable castings with convexed surface, making it unnecessary to gain pole.

Send for Catalog No. 8 of Nagel Specialties

THE W. G. NAGEL ELECTRIC CO.

26-30 St. Clair Street, Toledo, O.

COMBINED

Cash Register and Pay Station

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

No Disputes,

No Trouble.

It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE United States Coin Register Co.

TOLEDO, OHIO

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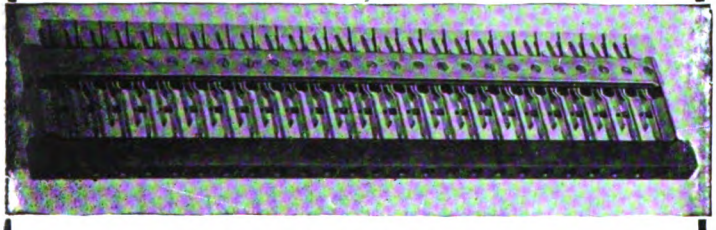
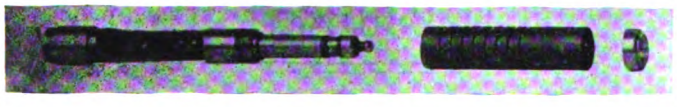
COMMON BATTERY

1500 LINE BOARD

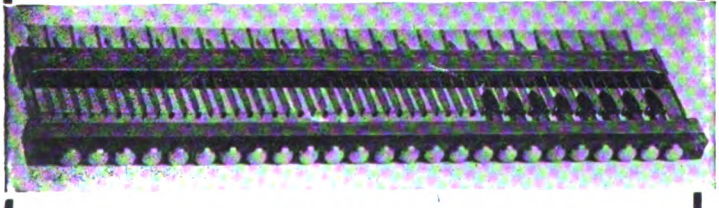
SWITCHBOARDS



MULTIPLE JACK STRIP 25 JACKS



3 WAY MULTIPLE PLUG



LAMP JACK STRIP

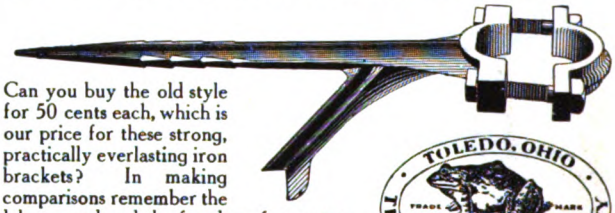
COMMON BATTERY RELAY

STERLING ELECTRIC CO.
LAFAYETTE, IND.

A REDUCTION THAT MEANS SOMETHING

We have made **NOVELTY POTHEADS** so cheap that it is both wisdom and economy to discard the old style sleeves. Not even expert lead-wipers can compete. Any ordinary man can install our **NOVELTY POTHEADS** with his own tools. We also make sleeves for straight-away and two and three branch sleeves. The prices, not the quality, have been lowered. *Write immediately for Catalog 199*

Our **SECURITY POTHEAD BRACKET** is malleable iron and linemen may stand upon it without danger. Can this be done with the old wooden block bolted or tacked to the poles?



Can you buy the old style for 50 cents each, which is our price for these strong, practically everlasting iron brackets? In making comparisons remember the labor saved and the freedom from vexatious breakdowns.

Write for Bulletin 189

TOLEDO, OHIO — THE F. BISSELL COMPANY — TRADE MARK

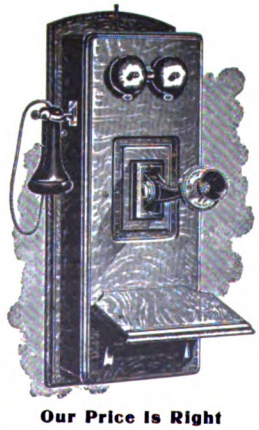
THE F. BISSELL COMPANY,
TOLEDO, O.

"They Never Pull Up"

THE MILLER SAFETY ANCHOR

Elmer P. Morris Co.
51 Dey Street - NEW YORK
Eastern and Export Agents

THE MILLER ANCHOR CO., Norwalk, O.



Our Price Is Right

1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

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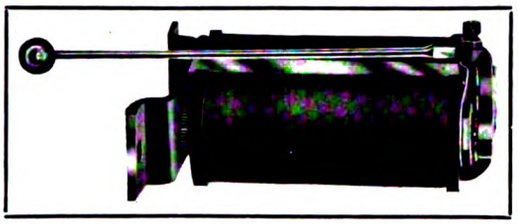
CORRECT RINGER CONSTRUCTION



The above cut represents style of ringer manufactured exclusively by the Swedish-American Telephone Company and clearly demonstrates that all ringer movements heretofore have been manufactured on the wrong principle. This ringer has a perfectly balanced magnetic field. *All* other ringers have the magnet on one side of the coils, thereby dissipating a good percentage of the energy, consequently the bells do not ring as loud and clear as they should nor will as many operate satisfactorily on one line as properly balanced ringers ought to.

The make-up of this ringer not only increases the efficiency but permits of the most durable and compact construction, fewer parts, more positive and accurate adjustment.

This ringer movement is 25 per cent. more sensitive than any other

Sectional drawings and full description of this ringer is one of the features of our No. 27 catalogue. It contains many illustrations of apparatus that will interest you.

ASK FOR IT

SWEDISH-AMERICAN TELEPHONE CO., CHICAGO, ILL.

BRANCHES: 615 Bee Bldg., Omaha, Neb.; 115 West 6th St., Kansas City, Mo.
112 Broadway, Fargo, N. Dak.

WHAT'S WRONG

with that TELEPHONE INVESTMENT of yours?

Why doesn't it pay you as well as the best of your investments?

Is the reason bad management or bad equipment? More likely the latter.

Probably the company is trying to do a 20th Century business with 19th Century apparatus.

If that's the case, it is spending more and earning less than it might if it had our Automatic Telephone equipment.

This is the only really modern telephone system. It produces the ideal telephone service—quick, sure and secret—at half the operating expense of a manual equipment, and this service commands better rates.

It costs a fixed price per hundred lines to enlarge the automatic exchange, instead of an increased price per each hundred lines, as in the manual equipment.

The automatic exchange is never outgrown; it never has to be "scrapped" and replaced by a complete new one, as with the manual. You just add to it as you do to a sectional book-case.

All these points bear upon the stability and value of your telephone securities. They mean dividends to you.

Over ninety per cent. of all the large orders placed during the past few years, either for new installations or replacements, have been for our automatic system, and all the companies adopting it have, from the increased earnings, been able to pay the interest on their bonds and a good dividend on their stock.

Our Automatic System has been adopted in the following cities:

Aberdeen, S. D.
Akron, Ohio.
Albuquerque, N. M.
Allentown, Pa.
Auburn, Maine.
Auburn, N. Y.
Battle Creek, Mich.
Bellingham, Wash.
Berlin, Germany.
Buxton, Iowa.
Cadillac, Mich.
Chicago, Ill.
Clayton, Mo.
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AUTOMATIC ELECTRIC COMPANY

Van Buren and Morgan Streets, CHICAGO, U. S. A.

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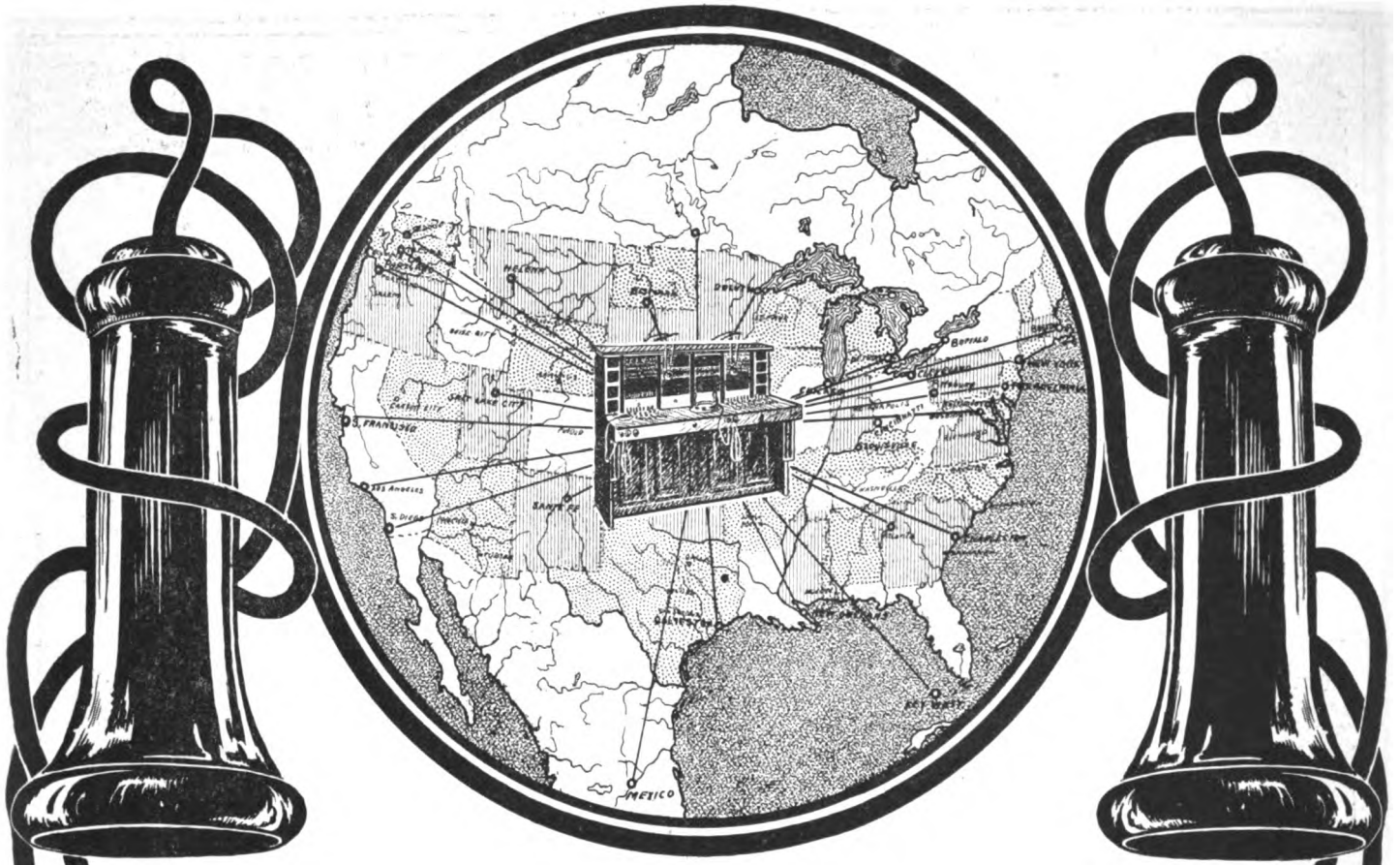

LOOK—LISTEN

IS YOUR EXCHANGE CONNECTED WITH THE OUTSIDE WORLD?

This is a very important matter and should receive prompt and careful consideration.

Prompt action is necessary if you are **NOT** connected, because **TOLL** business is very profitable, and toll lines are a great factor in the building up of every local exchange.

Careful consideration is necessary because it is very important to secure the **BEST**, the most **RELIABLE** and **EFFICIENT** equipment.

The name **STROMBERG-CARLSON** on a telephone or switchboard is a guaranty of excellence, thorough reliability and the greatest efficiency. These qualities are due to knowledge, skill and wide experience, together with the fact that only the best material obtainable is embodied in their manufacture.

Look into it **NOW**. Let us know your requirements and write to-day for Bulletin 12-B. It tells all about Toll Boards.

STROMBERG-CARLSON TEL. MFG. CO.

MAKE A SPECIALTY OF TOLL BOARDS

ROCHESTER, N. Y. CHICAGO, ILL.

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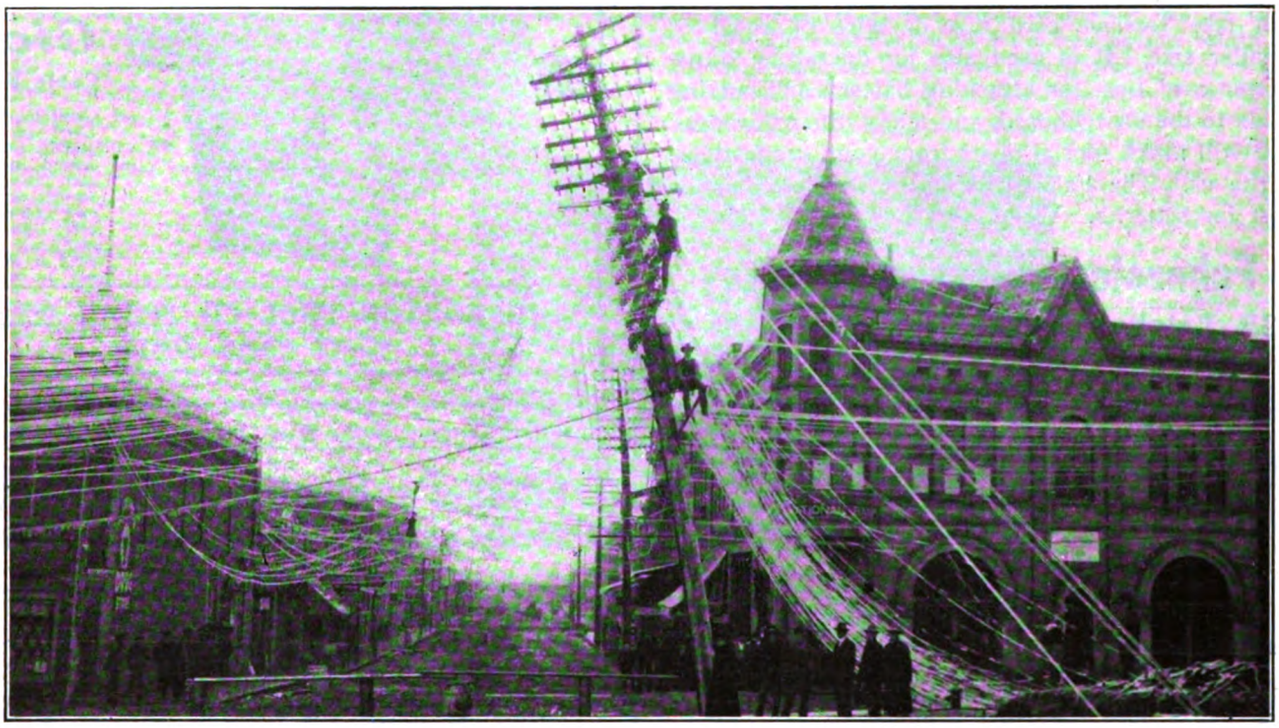
WE MAKE CABLE

DEPRECIATION

In the annual report to the stockholders this item is of particular significance. If you have a well constructed plant upon which the maintenance costs are low, the charges for depreciation or reconstruction will be moderate. But if the line plant is of open wire construction, its maintenance will be costly. Perhaps you may not have suffered much with broken wires or experienced any damage



What a Storm Does to Telephone Lines.--Cable Is Safe

from wind and snow during the past winter, and therefore feel safe.

If you look at the accompanying illustration you will get a good idea of what may happen to your system during the coming winter, and remember it is not a remote possibility either.

If you substitute cable for your open wire leads you are pursuing a conservative course. Aerial cable leads are rarely affected by weather conditions. When corectly installed the maintenance charges are very low under the most exacting conditions, and consequently the net revenue from an all-cable plant will be larger than if open wire lines are employed.

Let us tell you why Stromberg Carlson Cable is the best and consequently the only kind you should consider. Our Booklet 79B tells you how it is made, and we will give you additional proof.

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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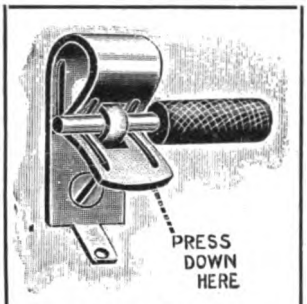
Every Wire Connection



No. 5—Spring Binding Post.

in the exchange, or at the subscriber's station is better made with

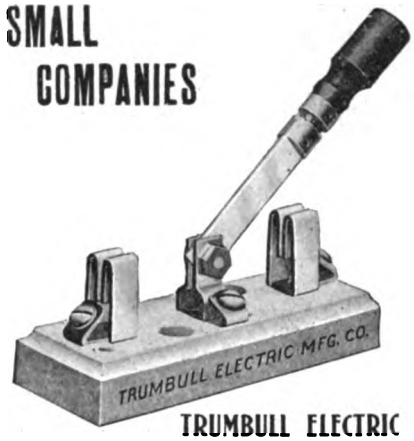
Fahnesteck Spring Binding Posts

than in any other way.

Our **NO. 5 POST** illustrated this week is fitted with a lug to which the wire is soldered. This post will take receiver cord tips or wire of equal or smaller size. It is used also for operators' transmitter cord tips, for attaching battery and ringing leads to the switchboard, and many other purposes. We will make special posts from your suggestions. Write us. The Fahnestock is the standard binding post for batteries. Write for sample and prices.

Fahnesteck Electric Company
129 Patchen Avenue, Brooklyn, N. Y.

SMALL COMPANIES MUST ECONOMIZE



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The Trumbull "U" clip is sure.

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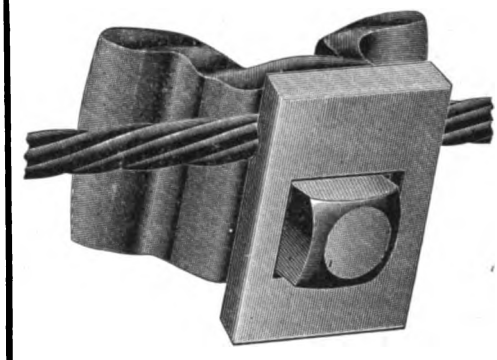
TRUMBULL ELECTRIC MFG. CO., Plainville, Conn.



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BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — Aerial—Underground—Submarine Lead Covered Cables

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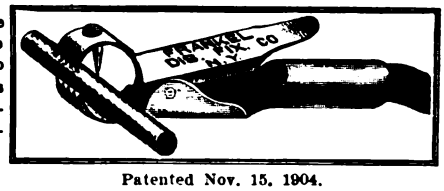

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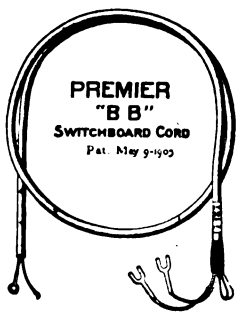

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Organization in Telephone Work

By P. Kerr Higgins.

At the head of the Accounting and Auditing Department is naturally the auditor, and his relations with the cashier are very close. While the latter is the subordinate of the business manager his department is open to the auditor, secretary and treasurer. His immediate superior is, however, the business manager and the others simply have the right to inspect the books and obtain reports from this department for the information of the board of directors, and this is only necessary on rare occasions. The cashier is the chief of his department and his assistant and all the clerks of his department are subordinate to him. The business manager looks to him for the collection of earnings from all sources so he is expected to keep careful and accurate records of the accounts of each and every source of revenue and expense. He will also be in charge of the payment of the wages and salaries in each department after proper "O K" by the head of the respective departments and the approval of the general manager or his assistant. The duties of this department are apparently well defined, but on account of the large number of accounts handled and their varied rating the work becomes almost an endless task and the various sub-divisions require careful systematizing. In the handling of the various accounts the card record is found superior to all others and Fig. 1 shows the subscriber's account statement. In addition to this many companies keep a lease record as in Fig. 2, which is usually a long sheet 15 x 20 inches, containing practically a history of each subscriber's account. In this record is kept a complete record of credits and debits for one year, when it is filed for future reference. Some companies keep a cost record for each subscriber. This would show the actual cost of installation and its earnings. This is convenient in cases of adjustment, for example if a subscriber should move it assists in determining whether or not it is well to force payment for the cost of moving. On the Pacific coast, especially in Los Angeles, this is found not only convenient but necessary on account of the transient character of the subscription list and it is customary to force payment for all moves when a subscriber has not had the service one year. The record is also useful in forming approximate cost estimates, the average being made from a large number of these. The voucher system is now almost universally in use for the taking care of the expense account, and the tendency is to employ a combination of voucher and check which very materially simplifies the system and reduces the work. The cashing of such a voucher check is understood to be a receipt for the money and is filed by numbers and entered by the bookkeeper in a similar manner to the old style voucher. This system of voucher-check is convenient for not only large but small exchanges, and ensures the return of the voucher. The distribution of the several accounts is a very important factor and a separate slip should be made for this, unless it is incorporated in the voucher-check (7 x 9) blank, as shown in Fig. 3. The system of accounting is changing very materially from the old method of bulky books to the new and more modern method of the card system, which is much more flexible. The only possible objection to this system is the possibility of losing a card, but this admits of carelessness, for proper locking devices are provided with all modern card systems so that in practice no card is ever lost. This locking device is simple and at the same time effective, and is operated by merely turning a thumb screw in front of the box or if desired a key may be used and kept by the chief. These cards are all numbered from one up, and these numbers may be either an account number or the telephone number, and should contain the name, address, rate, special equipment and space for 12 months, each month being divided for paid and balance due, space being left at the

David E. Evans, President of the Maryland Telephone and Telegraph Co., is at the Head of an Organization Which is Developing Independent Service in Baltimore to a High Point of Efficiency.

B. S. Josselyn, Vice-President of the Maryland Telephone and Telegraph Company.

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NO. _____ RATE

NAME

ADDRESS

DATE P'D	RENT	TOLLS	TOTAL	BALANCE CR.	BALANCE DR.	REMARKS

Fig. 1. Form to be used for statement of subscriber's account.

bottom for remarks. The date of opening the account is also given (see Fig. 1). When rebate is allowed the rebate may be marked in red ink so that one may be able at a glance to distinguish between cash and allowance. In connection with this department the question has frequently been asked whether the position of cashier should be held by a man or a woman. It has been the experience of the writer that in the smaller exchanges, say less than 1,500, a woman is preferable, but over that amount a man is to be preferred. The cashier of the larger exchanges must not only be a first class bookkeeper and possess executive ability but be able to talk telephone, and, when necessary, take the place of the manager. He is therefore to all intents and purposes the assistant manager, except in exchanges of say over 10,000 subscribers, when the position of business manager becomes necessary.

R. F. Bonsall, Treasurer, Maryland Telephone and Telegraph Co.

The cashier must be possessed of a fine knowledge and understanding of human nature, as usually he is called upon to make adjustments and settlements of all kinds. The books usually required in this department over and above the voucher-check system, already explained, are a double entry ledger, a daily blotter and the voucher-check record. The daily blotter is a combination of day book and journal with ruling for the latter. In view of the fact that no two companies use the same style of voucher or voucher-check the ruling of the voucher-check record will be made to suit the requirements of each individual case. It is customary to pay all bills by voucher-check only, hence, where small payments of say less than one dollar are made, the manager or cashier takes care of them in his petty cash account, which is usually fixed at ten dollars, which when used is turned in on a voucher in the usual manner. In this way the petty cash is taken care of without the necessity for a petty cash book, and the dispensing with the cash book does away with the need of a cash account in the ledger, as the bank account will give the required information. When the voucher-check is entered in the proper record, as shown in Fig. 4, the distribution account is copied from the side or back of this, as the case may be, and transferred to the columns in the ledger for that purpose, the total being carried to its proper column. The details having been carefully entered and the amounts checked, an account is then opened in the ledger for each separate classification, the total of its column being posted on the debit side and the total amount being posted to the credit of the accounts payable. It is customary to enter these accounts in groups so as to save time, and all entries, both paid and unpaid, must be made; when paid the date and amount will be entered under the proper column. The grand total must equal the total of all the several columns, except the amount paid. If no mistakes were made the necessity for a separate column for voucher number and check number would be unnecessary, but in practice we find this condition impossible. In entering in the ledger we only enter the total of the corresponding column, for example, operating, maintenance, etc.

DATE	VOUCHER NO	CHECK NO	NAME	FOR	DATE PAID	AMOUNT	LEDGER	DISTRIBUTION OPERATING	DISTRIBUTION MAINTENANCE	DISTRIBUTION GEN'L EX.	DISTRIBUTION CON.

Fig. 4. Monthly voucher record, with distribution columns.

CONTRACT NO	NAME	ADDRESS	TEL NO	CLASS OF SERVICE	DATE OF CONNECTION	RATE	JANUARY DUE	JANUARY PAID	JANUARY BAL	SPACE FOR 12 MONTHS	REMARKS
	BROUGHT	FORWARD									

Fig. 2. This form for subscriber's lease record, is made 12 x 15 inches in size.

VOUCHER CHECK _____

HOME TELEPHONE CO.
LOS ANGELES, CAL.

DISTRIBUTION

OPERATION $ ¢

MAINTENANCE

GENERAL EXPENSE

PLANT

TOTAL

VOUCHER CHECK
HOME TELEPHONE COMPANY
LOS ANGELES, CAL.

NO. _____ DATE

NAME _____ ADDRESS

MAKE NO CHANGES - RETURN PROMPTLY

O K _____ CASHIER

CORRECT _____ MANAGER

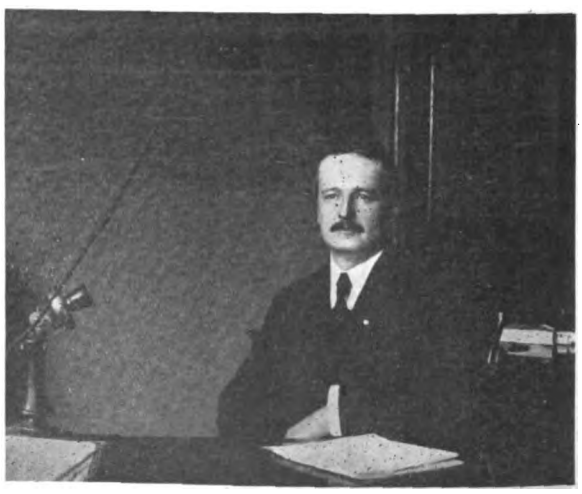
APPROVED _____ TREAS

WHEN PROPERLY SIGNED THIS VOUCHER WILL BE HONORED BY THE _____ BANK

RECEIVED PAYMENT IN FULL FOR ABOVE ACCT. _____ DOLLARS

DATE _____ SIGNED

Fig. 3. Voucher check, designed for the Home Telephone Company of Los Angeles.



H. W. Hinton, Purchasing Agent of the Maryland Telephone and Telegraph Co.

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This then brings us to a classification of the different accounts. On the earnings side, or the receipts of a plant, we find all

CONTRACT NO.
DATE
NAME
ADDRESS
$ RENT-TOLLS $
TOTAL $
FROM
TO

HOME TELEPHONE COMPANY
LOS ANGELES CAL.
CONTRACT DATE
NAME ADDRESS
TO RENT OF TEL FROM TO
- TOLL AS PER STATEMENT
- MOVING CHARGES
TOTAL
RECEIVED PAYMENT
BY

Fig. 5. Form for toll or rental receipt.

receipts come under these heads, as follows: Telephone rentals, toll commissions (or receipts), miscellaneous. On the expense side we find four main divisions, operating, maintenance, con-

DATE		FROM	AT	TO	AT	$	¢
					TOTAL		

Fig. 5a. Back of toll and rental receipt shown in Fig. 5.

struction and general expense. The first, second and fourth are regular, the third is irregular, or does not properly come under the regular work of the exchange, as it should be a separate account taken care of by a fund set apart for that purpose. The author appreciates its importance and knows that it is customary and good economy to have the regular working force take care of this department, but in order to do justice to the running account of the plant, it should be kept in a separate account. In this account would be the original cost of the plant, for example, real estate, wire plant, underground and aerial cable plant, sub-station equipment, central office equipment, fixtures, furniture, the original books and forms to set the plant in operation and any and all improvements, extensions or additions made to the plant with a view to increasing its value, hence, the lines between maintenance and construction must be finely drawn, and having once been made no deviation from them should be permitted. It is therefore imperative that a clear understanding must be had in the beginning so as to start off right. Any changes, additions or improvements which are intended to replace worn out or destroyed apparatus must not come under this head; for example a lead of wires may be completely destroyed by a storm or a fire. While this is extraordinary maintenance it cannot be taken care of by the construction account, but may be allowed for under the depreciation allowance and a sum of money transferred from that account or simply left there, it being understood this account is for such a purpose. It is apparent therefore that the plant having been constructed and charged to that account it is the function of the maintenance account to see that it is kept in first-class repair. In some companies two accounts are kept, the original construction being known and carried as "Plant," the every-day construction as such and transferred to "Plant"

CHECK COLLECTION SLIP

COLLECTOR DATE

TEL. NO.	CHARGES	RENTS		TOLLS		TOTAL	

GRAND TOTAL

REC'D SLIPS COLLECTOR

RETURNS O.K. CASHIER

Fig. 6. Collection slip, made in duplicate.

W. G. Bailey, Manager of the Telephone Department, Maryland Telephone and Telegraph Company.

COLLECTION REPORT 190

RENTALS			TOLLS			MISCELLANEOUS			TOTALS	

Fig. 7. Daily report to be sent by the cashier to the secretary.

RATE MESS. EXTRA NAME ADDRESS TEL. NO.
CONTRACT NO. YEAR COMMENCED
DEBITS CREDITS DEBITS CREDITS

Fig. 8. Form designed for rental register.

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The Location of Cable and Line Faults

By J. Adler.

THE location of trouble in cables or open lines is generally, or at least should be, accomplished by some form of the Wheatstone Bridge. The forms which different makers give to the mechanical details of the bridge are various, but the electrical requirements always necessitate the use of a battery or some other source of current, a galvanometer or telephone receiver to detect differences of potential, and a series of resistances of different values.

These three parts are arranged to give a circuit like that shown in Fig. 1. A and B consist usually of three coils of the value 1, 10, 100 and 10, 100, 1,000 ohms respectively; R is a resistance adjustable from 1 to 1,000 or 10,000 ohms; G is a galvanometer or telephone receiver; B is a battery of four or five cells, E. M. F. about six volts; L, L^1, points where unknown resistance is introduced. Some testing sets have a commutating device to reverse the connections at the points 1 and 3, which permits a greater range of measurement. This commutator is shown to the left in Fig. 1. A bridge that is to be used mostly for location work should have a two point switch in the galvanometer circuit to connect one terminal of the galvanometer either to the junction of the bridge arm and the rheostat (3, Fig. 1), or to the line post L, and also a switch in the battery circuit to throw the battery to the post L^1 or ground; also keys to open the

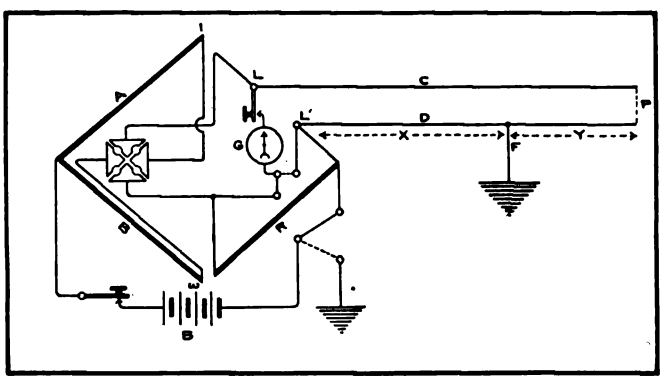

Fig. 1. Arrangement of Wheatstone Bridge. commutating device, etc.

galvanometer and battery circuits. The adjusting of the rheostat is accomplished in one of three ways, as follows: By shunting out portions with plugs; (2) by cutting in different coils in series, also with plugs; (3) by a movable arm travelling over a set of contacts. In case No. 1 the resistance coils are usually sixteen in number and have the value 1, 2, 3, 5, 10, 20, 30, 50, 100, 200, 300, 500, 1,000, 2,000, 3,000, 5,000. In cases Nos. 2 and 3 the coils are forty in number and consist of 10 units, 10 tens, 10 hundreds and 10 thousands.

When the resistances of A and B are equal and R is adjusted so that no current flows through G, then the unknown resistance is equal to the value of R. If the unknown resistance is less than the lowest value of R, make A smaller than B, then balance as before and divide the value of R thus found by the ratio of B to A. That is, if X is .75 ohms and A = 10 ohms and B = 100, a balance will be obtained when R is 75 ohms. For measuring large values A should be greater than B, and multiplication performed instead of division.

The tests usually employed for determining the position of a fault are the Murray and Varley tests. The Varley test is for most purposes the more rapid and more easily made, but the Murray is to be preferred when low resistances will be encountered. A third test, Blavier's, is sometimes used, but not often, for it only fits a few special conditions not usually found outside of a labaratory. Both the Murray and Varley tests require the use of a wire free from trouble, which can be connected to the extreme outer end of the faulty wire under test.

The Varley test is made as follows: Consulting Fig. 1, A B R is the Wheatstone Bridge. P is the end of the cable run or aerial lines, C the good wire and D the bad, connecting to the test set via the line posts L and L^1. X is the resistance of the bad wire from the test point to F, the fault. Have the switches in the position shown by the heavy lines. Connect the wires C and D at P. Have the arms A and B of an equal value, say 100 ohms. Connect D to the post which leads directly to the rheostat, in this case L. Obtain a balance on G and read off R, which equals the resistance of the looped wires. This may be called L. Then ground the battery as shown by dotted line on battery switch, and balance G again. Call the second reading R. From these two readings the following formula is obtained:

$$A : B = (L - X) : (R + X) \quad (1)$$

$$AR + AX = BL - BX \quad (2)$$

$$AX + BX = BL - AR \quad (3)^*$$

$$2AX = A(L - R)$$

$$X = \frac{A(L-R)}{2A} = \frac{L-R}{2}$$

That is, the first loop resistance, minus the second reading with the grounded battery, divided by two, gives the resistance of the bad wire to the fault from the instrument. The number of feet can then be calculated from the gauge of the wire and a table of wire resistances. This method is not entirely satisfactory, because the resistance of the wire varies so much with the temperature, being high in summer and low in winter. The change is especially noticeable in aerial cables or lines, varying as much as 5 to 15 per cent. This undesirable condition can be obviated in this way: An inspection of Fig. 1 will show that L — 2X equals the loop resistance from P to the fault F, and from formula 1, R = L — 2X. Now, if the wire is of uniform resistance throughout and of a known length, divide R by L and multiply the length by the quotient thus obtained. This will give the length from the point P to the fault F. If the length of the line is not known, but the gauge is, multiply R by the number of feet per ohm of the wire from P to F. This gives the length from F around P, to a point opposite F on the good wire. To get the length F P, divide by two.

An example will explain the use of these three mthods.

A No. 19 gauge cable is 7,625 feet long.

19 gauge wire equals 122 feet per ohm at 70° F.

L, the resistance, is 125 ohms.

R, the Varley reading, is 25 ohms.

$$\frac{L - R}{2} = \frac{125 - 25}{2}$$

$$\frac{R}{L} \times \text{length in feet.}$$

$$\frac{25}{125} \times 7{,}625 = 1{,}525 \text{ feet P to F.} \quad (2)$$

$$\frac{R \times (\text{ft. per ohm})}{2} = \frac{25 \times 125}{2} = 1{,}525 \text{ feet, P to F.} \quad (3)$$

The Murray test is made with the galvanometer switch in the dotted position, and the B arm equal to zero. Measure the loop with the battery switch in the heavy line position, and as in the Varley test, call this resistance L. Ground the battery and adjust the rheostat as before, calling this reading R. These two readings enable one to work out Formula 2, which means that X, the distance from the test set to the fault, equals the product of the whole loop resistance as taken first, and the Murray reading taken second, divided by the sum of the resistance of the A arm and the Murray reading.

Note here that the good and bad wires are to be connected to the same posts as in the Varley test. In making the Murray test the same trouble may be experienced from temperature changes as was met with in the Varley test. To avoid annoying corrections, if the cable is of the same gauge throughout take

*Since A = B it can be substituted for B in the equation.

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half the resistance of the loop and divide it into the resistance to the fault as found by the formula:

FORMULA 2. $A : R = (L - X) : X$

$$A X = R L - R X$$

$$A X + R X = R L$$

$$X (A + R) = R L$$

$$X = \frac{R L}{A + R}$$

This quotient should be multiplied by the length in feet. This will give the distance in feet to the fault from the instrument. Another way of arriving at the same result is to double the Murray reading, divide this by the Murray reading plus A, and multiply by the length. This second one is the easier, but is only a development of the first, as can be seen by the following formula:

FORMULA 3. $$\frac{\frac{R L}{R + A}}{\frac{L}{2}} = \frac{R L}{R + A} \times \frac{2}{L} = \frac{2 R}{R + A}$$

Both these tests have been considered as being made on grounded wires, but a shunted or crossed pair can be located in the same way. In Fig. 2, A is a pair, conductor 2 of which is crossed with conductor 1 of pair B. C is a shunted pair.

If conductor 1, of pair C, is looped to a good wire, and a ground put on conductor 2 at either end, then the Murray or Varley tests may be made as in the case of a grounded wire; for conductor 1 is practically grounded at the point where it touches conductor 2. The crossed pair may be treated in the same way. Pair A is shunted at the far end, or the crossed wire is looped to a good one, and a ground put on either end of conductor 1 of pair B. When a cable has failed, that is when all the wires are bad, or when other conditions prevent the use of a good wire similar in resistance to the bad one, if a clear pair of any kind can be obtained to a point beyond the trouble, a location can be made as follows: First shunt the good pair at the far end and measure its resistance, calling it P. Then connect one side of it to the bad wire and measure again. Call this P_1. Third, make the Varley test and determine X as usual. Subtract one-half the first loop P, from the second loop P_1; divide this result into X as found, and multiply the length of the bad wire in feet by this quotient. This gives the distance to the fault from the instrument. A formula which gives this operation in a condensed form is as follows:

FORMULA 4. $$\frac{\frac{X}{P}}{P_1 - \frac{P}{2}} = \frac{X}{\frac{2 P_1 - P}{2}} = \frac{2 X}{2 P_1 - P}$$

$$\text{Length in feet} = \frac{2 X}{2 P_1 - P}$$

This test is particularly useful where the length of the bad cable only is obtainable. In the above test with the bad wire connected to the usual post it may not be possible to get a balance on G. In such a case, reverse the positions of the good and bad wires and try for a balance. Formula 1 must then be changed to read

$$X = \frac{L + R}{2}$$

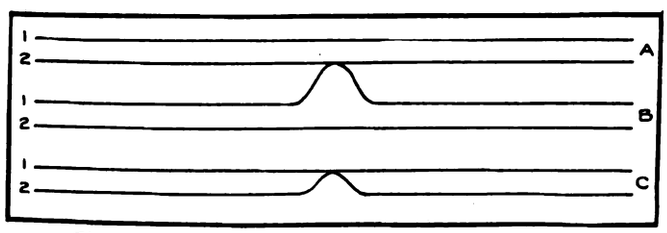

Fig. 2. Conditions existing in crossed or shunted pairs.

Beside its use for the above-mentioned tests, the Wheatstone Bridge can be used to a limited extent to locate open wires. When two condensers are connected, as shown in Fig. 3, if A and R are equal and the capacities of the condensers are equal, no deflection will be noticed at G when the battery circuit is closed. If this is not the case a kick or throw of the galvanometer needle will occur. Assume that D is less than C and unknown; adjust R till there is no throw of the needle in closing Ba. The resistance of A is to the resistance of R_1 as the capacity of C_1 is to the capacity of D. Formula 5 gives the capacity of D in microfarads when C is known.

FORMULA 5. $A : R = C : D$

$$A D = R C$$

$$D = \frac{R C}{A}$$

A cable wire is really a form of condenser, the sheath forming one side, the wire the other, and the covering of the wire the dielectric or insulating medium. Its capacity varies directly with its length, a long wire having high capacity and a short one small capacity. This being so, if the capacity of a wire is known, its length can be easily calculated, all standard cables having a given capacity per mile, which the makers furnish. In Fig. 3 replace D with a clear cable wire. This is done by grounding one side of

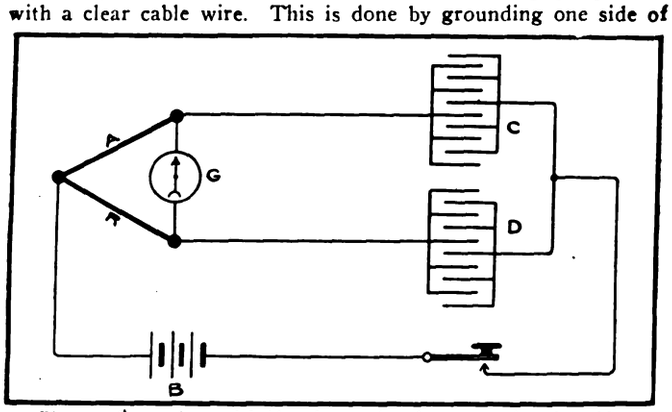

Fig. 3. Corrections of bridge for testing for open wires in cable.

C and grounding the battery. By adjusting R and using Formula 5, the capacity of the cable wire can be found, and from this its length. Now if it is open half way out in the cable its capacity would only be half that of other wires in the cable. If the cable is two miles long, and its capacity is given as 1-10 microfarad per mile, a wire good the full length should be 1-5 microfarad capacity. If the reading taken on the bridge indicates only 1-10, it is safe to say the wire under test is open about half way out. This test can be considerably shortened if the condenser C is replaced by a wire known to be good the full length of the cable. If this is done, simply ground B, and you have the same condition as in Fig. 3. Since capacity varies directly with the length, Formula 5 can be transformed into Formula 6 by replacing C and D in microfarads by C and D in feet.

FORMULA 6. $$D \text{ in feet} = \frac{R C \text{ (in feet)}}{A}$$

The connections of the bridge for this test are nearly identical with those for the Murray. The arm B is zero, thus connecting R directly to A, the galvanometer and battery switches being in the dotted position (Fig. 1). In this test if the balancing is to be done by noting the deflections of a galvanometer, a very sensitive one is needed, and as much a one is not usually furnished with the bridge, it is better to use the following method:

Replace G with a good telephone receiver and use an interrupted current in place of the battery; that from a buzzer, medical coil; or ringing generator will do. When the sound in the receiver ceases or reaches its lowest point, a balance has been obtained. A wire that is grounded and open cannot be located by this method unless the other end beyond the ground happens to be clear, when a location might be tried from the other end. The gauge of the cable makes very little difference in this test, the capacity varying very little with the gauges in ordinary use.

(To be continued.)

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Economical Telephone Accounting and Filing Systems

ARTICLE VI.—VOUCHERS AND FORMS FOR RECORDI NG THEM.

*By Charles C. Wilmot, Telephone Accountant.

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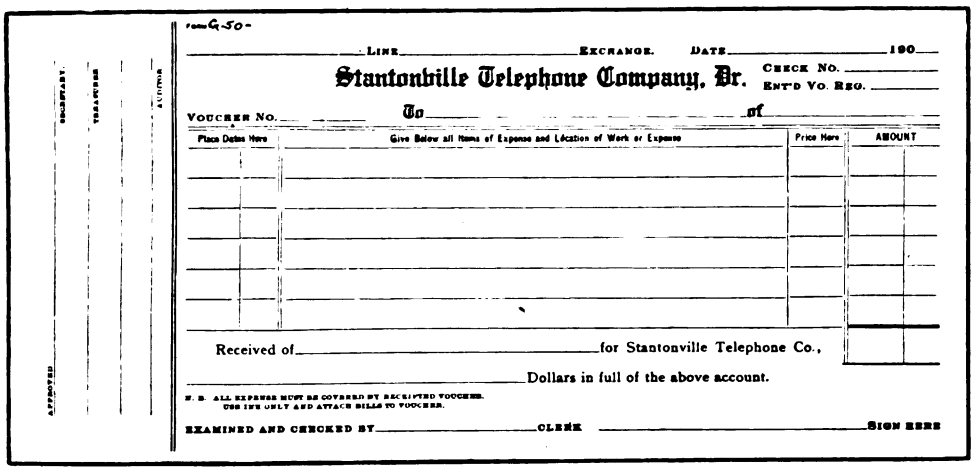
THE method of handling vouchers for expenses incurred by employees of the telephone company should be such as to insure accuracy and proper verification by the men who handle these papers in the office. Form No. G-69 illustrated in connection with this article was designed to meet the needs of every general office auditor for a simple form to be furnished to the local managers of all branch exchanges, construction and maintenance foremen, or any other employees who have the handling and paying out of more or less money for which they are required to produce and list a lot of expense vouchers in order to make a settlement with the office.



Form G-50.

Line _____ Exchange. Date _____ 190__

Stantonville Telephone Company, Dr. Check No. _____ Ent'd Vo. Reg. _____

Voucher No. _____ To _____ of _____

Place Dates Here	Give Below all Items of Expense and Location of Work or Expense	Price Here	AMOUNT

Received of _____ for Stantonville Telephone Co.,

_____ Dollars in full of the above account.

N. B. ALL EXPENSE MUST BE COVERED BY RECEIPTED VOUCHERS. USE IPE ONLY AND ATTACH BILLS TO VOUCHERS.

EXAMINED AND CHECKED BY _____ CLERK _____ SIGN HERE

APPROVED SECRETARY TREASURER AUDITOR

Form G-50. Form of voucher used for taking of receipts for petty disbursements.

This form is in duplicate, so that each employee using it has his carbon copy to refer to, and can thus keep his own current account in the top section of form, with ample space for the proper listing of every voucher sent in. Each necessary step for the verifying and authorizing of the settlement is provided for. Several blanks can be used for any especially long settlement containing many items.

When the settlement is made and check issued the form can be folded about the expense voucher (Form G-50) like a band, so as to show the distribution, check number, date of settlement, etc. The package may be fastened with a small rubber band, paper clip or pin, according to the size of the package, and filed in a simple voucher jacket in which the cancelled check, when returned from the bank, is also filed.

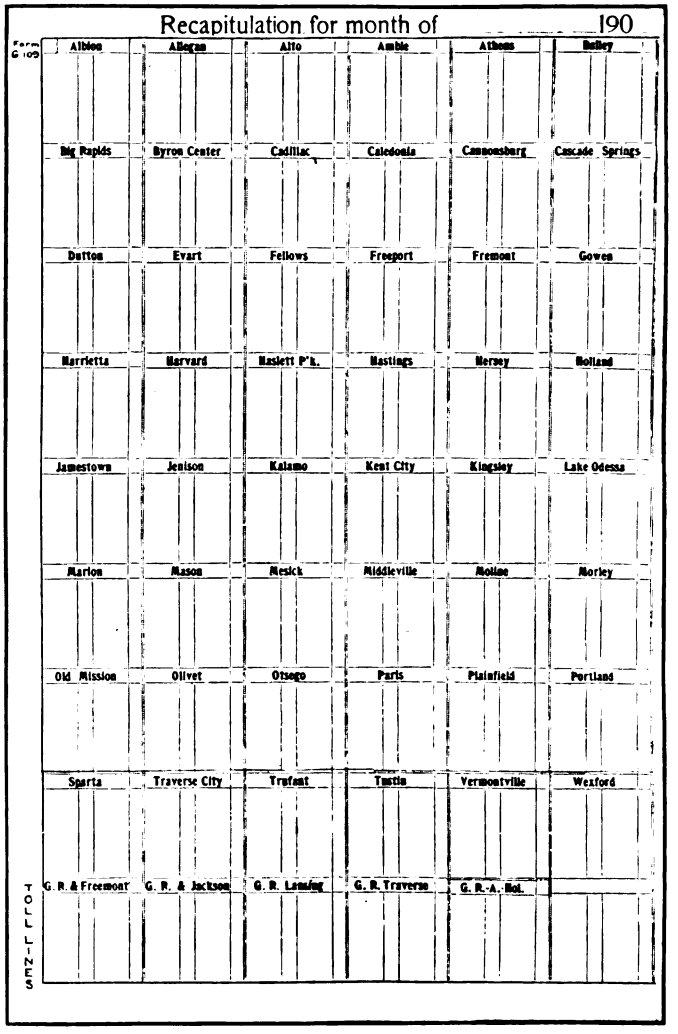
When the annual or semi-annual audit is made the authorities for a large share of the disbursements of a telephone company are at the immediate service of the auditor, and at all times can be readily referred to by the office force or management.

In many cases it might be more desirable to file packages in a shallow tray or drawer between guide cards lettered with the name of the exchange foreman or employee. The expense voucher for a year or period of years would thus be filed in monthly consecutive order, under the name of the exchange or employee.

The simple form for an expense voucher, form No. G-50, is self explanatory and is used for the taking of receipts for petty disbursements. The most satisfactory manner of keeping these forms is to have them put up in pads of 50 to 100, with plain manila sheets for carbon copy duplicates. Much waste of stationery and small forms is avoided by having them padded or blocked in specific quantities. This also saves time in filling of orders to be sent out to branch exchanges and taking inventory of stock on hand as quantities may be very easily checked off.

The monthly recapitulation, form No. G-109, is a great time saver to the book-keeper or clerk who has a large amount of freight bills, express bills, shop orders, repair orders, railroad mileage, time and labor charges, etc., to distribute over a large system of exchanges and toll lines. With the exchanges alphabetically arranged, leaving a few blank spaces for additions, it is easy to distribute rapidly a large number of vouchers. When footed this sheet can be rechecked and authorized by auditor and made the basis or authority for a journal entry at the end of each month. The size of the sheet, when properly folded, is 9½ x 11 inches, the same as that of forms Nos. G-75, 76, 77, 78, etc., illustrated in a previous article.

It is most desirable and important for the purposes of a satisfactory



Recapitulation for month of _____ 190

Form G-109

Albion	Allegan	Alto	Amble	Athens	Bailey
Big Rapids	Byron Center	Cadillac	Caledonia	Cannonsburg	Cascade Springs
Dutton	Evart	Fellows	Freeport	Fremont	Gowen
Harrietta	Harvard	Haslett P'k.	Hastings	Hersey	Holland
Jamestown	Jenison	Kalamo	Kent City	Kingsley	Lake Odessa
Marion	Mason	Mesick	Middleville	Moline	Morley
Old Mission	Olivet	Otsego	Paris	Plainfield	Portland
Sparta	Traverse City	Trufant	Tustin	Vermontville	Wexford
G. R. & Freemont	G. R. & Jackson	G. R. Lansing	G. R. Traverse	G. R.-A. Bol.	

TOLL LINES

Form G-109. By the use of this form for monthly recapitulations much time may be saved owing to the facility with which items may be properly placed under the proper station.

* Editor's Note.—Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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office filing system to have the main reports and forms of a telephone company as nearly uniform in size as possible. All the important report forms of any branch exchange can be thus kept,

Form G. No. 69.

List of Vouchers sent in to General Office

CITIZENS TELEPHONE CO., Grand Rapids, Mich.,

From _____ *Mich. Date* _____ *190*__

TO AUDITOR:—Enclosed find _____ *Vouchers as per itemized list given below, same being for Expenses from Date* _____ *190*__ *to Date* _____ *190*__.

According to my records and last report of _____ *190*__, *there was*

COMPANY DEBITED		COMPANY CREDITED	
BAL. DUE ME FROM CO.		BAL. DUE CO.	
SENT TO CO. EXP. VOUCHERS		REC'D FROM CO. DURING MO.	
SENT TO CO. CASH BELOW			
AMOUNT OF VOUCHERS			
TOTAL		TOTAL	

Please send me check for $ _____ *To* _____

Signed by _____

VOUCHER NO.	NAME OF PARTY SIGNING VOUCHER	VOUCHER
TOTAL		

	DISTRIBUTION		
VERIFIED BY _____ 190			
AUDITED BY _____ 190			
APPROVED BY _____ GENERAL MANAGER			
APPROVED BY _____ SUP'T			
CHECK NO. _____ 190			

Form G-69. Voucher listing blank for use of local managers and foremen.

under a loose-leaf system, in one binder. The filing of the original at the general office may also be done in filing jackets or folders of a single size.

RURAL COLLECTIONS.*

By D. H. Owen.

AFTER experimenting with various methods of making rural collections there has been developed a system, now in use at the Lowell exchange of the Citizens' Telephone Company, which has proven itself to be successful and one which involves very little expense to the company.

Bills are made out promptly, and are always ready for collection on the first day of each month. Instead of mailing the bills to the rural subscribers the chief operator calls up each one separately and informs him that it is the first of the month and that his toll bill is, for example, 20 cents, and his rental bill is $4.00, making the total bill $4.20. She asks him to try and remember to call at the office the first time he is in town. They naturally do not all come in and pay, but on an average about 75 per cent. of the rural subscribers pay before the tenth of the month. Those who are a little slow, and are not in the habit of coming to the office, are helped by allowing the troubleman to take their bills along when he has trouble on their line, or in their neighborhood.

If a subscriber fails to call and the manager is unable to collect his bill when in his neighborhood, a bill is sent to him by mail, and attached to the bill, when the occasion warrants, is a slip of paper on which is printed the following:

"Unless the amount of attached bill is paid at our office within.....days of the date hereof, we shall be obliged to discontinue your telephone service until such payments are made. CITIZENS' TELEPHONE COMPANY.
"....., 190.."

Livery hire for the purpose of collecting is very small, the last bill for this purpose being incurred the first quarter of 1905. The operator notifies the subscribers of their bills at times when work is slack, and as there is no expense incurred it makes a saving of several dollars each month over mailing bills to each subscriber, and but little if any more work is involved.

Education is the secret of collecting. A point is made of educating the people in the company's rules, and the golden rule is that rental fees must be paid in advance. When a contract is taken it is impressed on the subscriber's mind that he must pay in advance, and when a rural telephone is installed the first collection is always made at that time, whether it be for a full quarter or a part of a quarter. The subscriber is told that after that time he is to come to the office to pay his bills, and that the collections must be in by the tenth of the month. The people are educated to the fact that the business cannot be run without money. This same rule applies to the local subscribers as well as to those on rural lines.

Most of the trouble experienced is with certain subscribers who made their contracts with a former solicitor, who led them to believe that they could pay their bills any time and it would be all right. It is hard to make these subscribers see that the rules are otherwise than as they were first informed.

From the method of collecting adopted the exchange has been compelled to report only two accounts that could not be collected; one was for 80 cents in 1900, and one for 70 cents in August, 1905, and after the general manager had allowed the rebate for the 70 cents, there was collected 50 cents on the account, which left just $1.00 uncollected for over six years' business.

ATTEMPT OF BELL COMPANY TO KILL COMPETITION IN OSWEGO.

A VERY interesting situation was created when a short time ago the Bell Telephone Company bought out the Ontario Telephone Company, of Oswego, N. Y. The Ontario Company was formed in 1897 by several of the most prominent business men of the city in which it operated; the purpose they stated at that time being to give the public low priced and efficient service, as much dissatisfaction was expressed with that given by the Bell company and the treatment accorded subscribers.

The Ontario Company as originally organized had a capital stock of $20,000. A plant was built which was considered to be good enough for the requirements of the service the company desired to give, and subscribers were obtained to the number of 250. Good service was given by the Independent company, and it is said that in a short time the Bell switchboard became so idle that the operator in order to occupy her time was compelled to bring along her knitting. The business of the Independent company grew to such proportions that in 1902 the capital stock was increased to $100,000, and a new common battery switchboard of modern type, and first class instruments were installed. A few improvements were made on the wire plant, toll lines were built, and various extensions completed From this time the most excellent service was given to the subscribers, the number of which has steadily increased to about 1,600.

In 1903 the Bell Company put up a new building, installed a

(*Continued on page 384.*)

* Abstract from paper read at the meeting of managers of the Citizens' Telephone Co., Grand Rapids, Mich.

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THE EDITOR'S PAGE

THE TELEPHONE AND THE PERSONAL ELEMENT IN BUSINESS.

DIRECT dealings between customers in their homes and sales people at its counters has been introduced by a large department store through the installation of an especially comprehensive telephone system, which provides an instrument for every two or three employees. The company has found that by this means its sales have been increased.

With the present system a customer may talk directly with the person who has the goods under his observation, and if it is required that a substitution should be made, a description of the nature of the material which may be furnished will be given to the customer, and no shipment need be made until the matter is thoroughly agreed upon. The prices may be stated, and it is a simple matter for any difference in quality corresponding to a difference in price to be explained, and many other little details of this sort can be quickly and permanently adjusted. In this way the store which aims to satisfy its customers can proceed to fulfill this object in a much more intelligent way, as it is better advised as to the desires of its patrons in each case.

Such a system, however, can only be successful when other conditions are adjusted to contribute elements just as essential as is the easy and rapid means of communication furnished by a telephone line. It goes without saying that the patience and courtesy in which the sales forces of the larger stores are so well trained are even more desirable qualities when conversation is held over the wire than when the sale is made over the counter. For successful selling by telephone it is found that more than adherence to these ordinary habits of a well bred person is needed. A salesman must use his imagination, have an intelligent curiosity, and ask in the shortest possible time just the right questions, or make just the right statements. In cases where substitution for the order originally called for by a customer is required in order to make the sale these qualities of salesmanship become especially useful. The introduction of the telephone on a large scale in establishments devoted to the selling of goods at retail will serve to emphasize rather than to limit the opportunities for the exercise by the salesman of those personal qualities which so generously contribute to the success of the company for which he works.

STREET RAILWAY TELEPHONES.

PUBLIC sentiment against a street railway company was strongly aroused the other day by an accident which occurred in the suburbs of a large city in the middle west. The cause of the indignation was that after a number of people had been injured there was no way of quickly summoning assistance. It was asserted by those familiar with the situation that if the street railway company had provided a telephone line, and suitable means for connecting instruments carried as a part of the regular car equipment, communication with headquarters might have been held at once, and the delay which was the means of so greatly increasing the suffering of the persons in the car would have been very much diminished.

This calls to mind the peculiar fact that, in general, long cross country lines, which are operated for carrying people between one town and another, are much better equipped for communication between headquarters and the various cars than are the lines of city railway companies. It is rarely indeed nowadays that we find a street railway run along the open highway which does not use a telephone system in connection with an orderly method of dispatching. Such a use of the telephone enables the management to operate its cars with maximum economy, as the despatcher is always aware of the approximate location of every one of the units which he controls. Although very efficient automatic signalling systems are in use, like all other electrical apparatus they sometimes fail to work. In fact they are very much less reliable than the telephone. With them, if the latter instrument is not also provided, the street railway conductor who is in doubt must often remain for a tedious length of time on a turn-out, or proceed on his trip at the greatest risk of collision.

In times of heavy traffic over a portion of the line there is nothing which can be satisfactorily substituted for this means of direct communication between the despatcher at division headquarters and each conductor. It is absolutely necessary that, by means of conversation with persons on the line, the despatcher should be immediately informed of any change of conditions introduced by accidents or any unexpected event, and he should be able to vary his orders in accordance with instructions received from points on the line. The use of the telephone for these purposes secures the fullest flexibility, and enables the operating officials to place each car where it is needed, and handle the reliefs and extra men effectively, and in fact to give a service which secures to the public the greatest possible satisfaction, and the largest profits to the company.

In view of the ample demonstration of its value which has been made by the telephone in the branch of railway service in which it has been given a thorough trial, it appears that the time for its development in connection with suburban street railway lines must be close at hand. It should be urged upon the operators of such lines that no reliance ought to be placed upon the chance that if a break-down occurs the location will be near a residence supplied with telephone connections. The very frequency with which cars are run on suburban lines is another circumstance which instead of being regarded as providing a means of offering assistance to a crippled car should be looked upon as an opportunity to effect economy and retain the good will of the public by maintaining without interruption the transportation of all passengers. It is undoubtedly true that those familiar with the use of the telephone should be able to advance many strong arguments which will hasten its more complete adoption by street railways.

KEEPING A SUBSCRIBER UP TO TIME.

D. H. OWEN, at the Managers' Meeting of the Citizens Telephone Company recently held at Grand Rapids, Mich., emphasized a point which deserves general attention. He brought out most clearly that many of his people were very willing to make their payments promptly and assist the company in every way possible, when they were told that it was necessary.

He found, however, that a solicitor who had been in the exchange before he took charge had given many of the people to understand that the company was a rich corporation, and could afford to wait for its money. Of course when this impression was spread the people who received it clung to it tenaciously, as it afforded them an excuse for following their natural inclination to hold their money as long as possible. The result was that from these subscribers, who were thoroughly honest, it was extremely difficult to get money on time. The point made by Mr. Owen in his paper is that from the very moment a subscriber is connected he must be given to understand that the company is doing business in a manner which requires prompt settlement of accounts, and he has found that the meeting of all dates by the company will cause the subscriber to take a corresponding action with regard to the settlement of bills.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

WHEN VERBAL LICENSE BECOMES IRREVOCABLE.

Can a person who has given verbal consent to the building of a telephone line across his property make the company remove the poles and wire after they have been in use nearly a year? Can he restrain said company from putting more wires on said poles? P. M.

THE verbal consent which the property owner gave to the building of a telephone line across his property amounts to a license. The license is revocable except where the licensee has expended a considerable sum of money in reliance upon it and in such case it becomes irrevocable. In accordance with these principles the property owner cannot make the company remove the poles and wires.

If the company has the right to place its poles on the land and use them for telephone purposes, it can string as many wires on the poles as it finds necessary or convenient for its business. The property owner cannot restrain the company from putting more wires on its poles.

OPERATING WITHOUT PERMIT IN NORTH CAROLINA.

We have an exclusive franchise in a town in this State. A rural company after making formal application for a permit, and being refused, ran a line into the town, placing its poles on private property and spanning the streets with its wires, and put in two or three stations by crossing the street in two places. It now wants to cross the same way and place other stations at the principal stores and thereby reach such points as its patrons most desire without having to connect with our exchange. The town aldermen have notified the concern not to cross the streets again. Please advise me as to the proper steps to take in the matter. Can the town officers have these people remove the wires they already have up? If they should put up others could the town have their wires cut down after having notified the company not to put them across any other streets, without involving litigation and trouble, or what would be the best course to take in the matter? J. D. M.

THE exclusive feature of your contract is of no value in itself, as towns have not the power to grant exclusive franchises. This does not change the fact that a telephone company cannot enter a town without a permit, and its entry as you describe it is illegal. The town officers can therefore cause it to remove the wires it has already put up, and prevent it from putting up any more wires. The best course to take is to have the town make a determined effort to exclude the intruding company from its limits. Whatever course is taken will undoubtedly provoke litigation on the part of the company opposed.

CITY OF CHICAGO CAN REFUSE PERMIT TO INTERSTATE COMPANIES.

THE two great telegraph companies doing business in Chicago and connecting the city with the rest of the world are, according to an opinion rendered by Assistant Corporation Counsel Maclay Hoyne, occupying the streets of the municipality without the vestige of a right and are liable for compensation not only for future privileges but for those past and unpaid for.

The assistant corporation counsel held that:

The city has the power to refuse a permit to companies for the use of the streets, despite the fact that interstate business is done.

The telephone and telegraph companies must have the city's consent to use the streets and must pay compensation for the privilege.

The city can exact license fees for the use of telephone and telegraph poles, wires and conduits—both for the past and future.

The telephone and telegraph companies can be compelled to place wires underground.

EFFICIENCY OF CIRCUIT BREAKERS AGAINST LIGHTNING.

AT Bangor, Me., Justice Whitehouse has handed down a Law Court rescript in the case of Wells vs. New England Telephone & Telegraph Company.

The plaintiff recovered a verdict of $804 for the destruction of her barn and its contents by fire alleged to have been caused by the negligence of the defendant company in the construction and maintenance of its telephone line past the plaintiff's premises on the west side of the highway in the town of Avon. There was a curve in the road, and to counteract the tendency of the line wire to draw a pole from its vertical position a guy wire consisting of a piece of ordinary telephone wire, was stretched from the pole to the corner of the barn.

Immediately before the fire, a thunder shower came up in the vicinity of the plaintiff's buildings. The rain fall was light, but it was followed by a discharge of lightning of extraordinary violence, though but a single flash of light was observed.

Justice Whitehouse stated that in view of the admitted limitations of human knowledge respecting the laws of electricity and the immeasurable potential of a lightning discharge, the opinion of electricians in regard to its possibilities in a given case cannot be adopted with the same confidence as expert opinions based upon knowledge of the more exact sciences; and in view of the manifest effects of the lightning upon the telephone poles and the corner board of the barn in this case, it is the opinion of the court that the evidence warranted the jury in following the conclusions of those experts who believed that the destructive spark was conveyed to the corner of the barn by the telephone wires, in preference to those who testify that the barn was struck by a branch of a lightning bolt discharged directly from the clouds.

If the defendant's theory is correct that it is utterly impracticable to divert lightning currents from such a wire to the earth by means of any insulators or circuit-breakers hitherto devised it cannot be said to be manifest error on the part of the jury to find that such a wire should not have been attached to the barn at all, and that in making such a connection, the defendant, if possessed of scientific knowledge to sustain its theory, did not act with proper regard for the rights of the plaintiff and the safety of her property.

COMPANIES MAY USE SAME NUMBERS.

THE suit brought by the Rocky Mountain Bell Telephone Company against the Utah Independent Telephone Company, and Elmer B. Jones its managing director, for an injunction restraining the defendant from using the same numbers in its directory that the complainant uses, and to prevent the managing director from using the same number for his residence telephone that was used by the manager of complainant for his residence, has been decided in favor of the Independent company. On the hearing the court refused to allow the complainant to introduce testimony because no cause of action was stated in the complaint, and the matters therein complained of were not actionable, and could not be recognized by the court in an injunction proceeding.

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IN THE OPERATING FIELD

MINNESOTA COMPANY PREPARING FOR INCREASED BUSINESS.

SEVERAL new lines are being constructed by the Granite Falls, Minn., Telephone Company, which will greatly extend the service in the rural districts. Amongst the circuits now under way is a line along the Yellow Medicine River which will connect with Echo and eventually give a direct route to Redwood Falls. Other lines are to be built to Palmer Creek and into the country northeast of Granite Falls.

The new directory issued by the company shows that it now has more subscribers in the city than the Bell ever had and in addition it has an extensive rural line service which is constantly expanding.

INDEPENDENT SYSTEM CONSIDERED FOR CANADIAN PROVINCES.

TELEPHONE conditions in the minds of Canadian legislators seem to be extremely uncertain, and there is far from a perfect uniformity of opinion. A bill providing for the incorporation of an Independent long-distance company is up for consideration before the Private Bills committee of the legislature sitting at Toronto. The company is to be known as the Provincial Long Distance Telephone Company. The Canadian Bell Company is making every effort to block competition, claiming that it would take away annually $200,000 of business which it now holds by virtue of exclusive contracts with the municipalities. Several matters to be embodied in a final measure were put to vote and unanimously carried in favor of the company's establishment, but many details of importance are yet to be considered.

PLANT OF THE CITIZENS' TELEPHONE COMPANY AT KOKOMO, IND., BEING ENLARGED.

IMPROVEMENTS which when completed will cost $20,000 are now being made to the plant of the Citizens Telephone Company, Kokomo, Ind. All the aerial cables in the business part of the city are to be placed underground and an additional 33,000 feet will be installed. The main switchboard is to be enlarged to take care of 500 additional lines and a separate board is to be installed for the farmers' lines. This will have a capacity for 200 additional subscribers. The contracts call for the completion of the work within two months, as the company is already hard pushed for facilities to handle its rapidly increasing business.

The capital stock of the company has recently been increased from $200,000 to $350,000 and the entire plant throughout the county is being re-constructed. As a single feature of this work the management has put up over 60,000 feet of cable. The exchanges at New Philadelphia, Canal Dover, Uhrichsville and Dennison are installing new central energy switchboards equipped for party line signalling. The outside cable has been re-constructed to form a complete multiple cable system. When all work at present under way is completed the plant will be one of the best in the State.

The company has been unable to take care of its increase of business and expects to install 1,000 telephones within the next year. A good system of toll lines connects with other Independent exchanges, as New Philadelphia is a center of the United States lines giving satisfactory service throughout Ohio, Indiana, Michigan, Pennsylvania, West Virginia and Kentucky.

J. K. Johnston has been general manager of the company since Nov. 1st, 1905. Under his direction the business has already grown rapidly, and the prospects for the future are extremely bright.

CUMBERLAND FAILS TO EXCLUDE INDEPENDENTS.

FRANKLIN, TENN., has recently granted a franchise to an Independent company after it had carefully considered the objections raised by the Cumberland (Bell) Company. J. H. Henderson, attorney for the Cumberland, was instructed to offer 3 per cent. of its annual gross earnings for an exclusive franchise. Notwithstanding this offer the aldermen decided that a competing company would benefit the people of the town, and an exchange will accordingly be established.

INDIANA ASSOCIATION URGES EVANSVILLE TO GRANT FRANCHISES FOR INDEPENDENT SYSTEM.

DURING the convention of the Independent telephone men at Indianapolis a telegram of cordial greeting was ordered sent to the Mayor and Board of Public Works of Evansville for the encouragement given toward the establishment of an Independent system in Evansville, and the secretary was also instructed to send to the Common Council of Evansville the following petition of this association:

To the Common Council, City of Evansville.

The Independent Telephone Association, in convention assembled, representing 150,000 of the 200,000 Independent telephones in the State of Indiana, operated by 400 different companies with an estimated capital of $20,000,000, respectfully petitions you to grant the Citizens' Telephone Company of your city a franchise which, while it safeguards the rights of the city, will permit the Independents to have connection with and entrance into Evansville.

Every county of the State is included in this convention, composed of 175 representatives. We deem it almost beyond explanation that Evansville, the second city of the State, should be one of the three county seats of Indiana having no Independent exchange. The more surprising does it become when we consider that the Independent subscribers in this State outnumber the Bell five to one and that there are 40 county seats with not even a Bell exchange franchise, and several where Bell franchises exist have exchanges numbering less than 75 telephones, in all of which the Independents have larger systems.

We desire to call your attention to the report of the Commercial Club of Indianapolis under date of May 5, which reads as follows:

"WE THOROUGHLY BELIEVE IN THE DESIRABILITY OF COMPETITION WITH THE BELL TELEPHONE COMPANY IN THE TELEPHONE BUSINESS IN INDIANAPOLIS, AND WE FULLY REALIZE THE BENEFITS WHICH HAVE BEEN DERIVED FROM COMPETITION THROUGH THIS INDEPENDENT COMPANY IN THE PAST."

This association, knowing that it is to the interest of Evansville, as it has been to the interest of Indianapolis, to have competition in the telephone business, requests that an Independent exchange system be admitted, which will insure the gates being opened to Independent toll lines, thereby giving your city telephonic connection with the great body of Independent telephones throughout Indiana, Kentucky, Illinois and the entire Mississippi Valley.

BELL COMPANY BUYS PLANT AND RAISES RATES AT STATESVILLE, N. C.

CONSIDERABLE dissatisfaction is being expressed by the people of Statesville, N. C., at the action of the Bell company. It recently bought out the old system of the local owner, and immediately afterwards stated that, on account of the considerable amount of necessary reconstruction which must be undertaken, the rates must be raised. The company has submitted to the Mayor of the city a schedule, and agreed to adhere to it for a period of four years, or until the number of telephones connected with the Statesville exchange shall be in excess of 650. On account of the large number of rural lines which are to be brought in the people seem inclined to believe that upon the expiration of four years the company will be perfectly able to find grounds for raising rates, and expect that such a raise

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will be forthcoming. Many of the citizens are anxious to see a new Independent exchange built.

VERSE FOR BLOTTER ADVERTISING.

THE Stephenson County Telephone Company, Freeport, Ill., is giving especially good service, and is naturally anxious to confer the benefit of this service upon as many subscribers as possible. The manager of the company, Mr. L. A. Herrick, believes in advertising, and devotes his energies sometimes to the production of matter which shows the effect of his convictions. One of his blotter suggestions is as follows:

The new telephone is like a door that swings each way.
You can misuse it and drive people off or
Keep orders coming day after day.
Let it swing nicely and have it well known
You delight to take orders over the New Telephone.

BELL SERVICE NOT WANTED AT CURRAN.

TO determine whether the Bell or the Union Telephone Company should receive the exclusive patronage of the residents of Curran, Ill., a meeting was recently held and largely attended. After thoroughly discussing the merits of both systems a unanimous decision was arrived at in favor of the Independent company. The Union company will immediately take steps to increase its facilities at this point in order to give its patrons the highest grade of service.

INDEPENDENT PLANT AT QUINCY, ILL., NEARING COMPLETION.

CONSTRUCTION work upon the plant of the Quincy, Ill., Home Telephone Company was started on October 18, 1905. Up to date about 90 per cent. has been completed and it is expected that the system will be in operation by the fifteenth of June. At that time 3,000 lines will be placed in service and it is expected that by the end of the year 5,000 subscribers will have been secured. The total cost of the plant will be in the neighborhood of half a million dollars, upwards of $360,000 having been expended already.

The officers of the company are Jackson R. Pearce, president; Frank J. Perrick, vice-president and attorney; J. H. Murphy, secretary and treasurer, and Frank A. Parker, manager.

FIRST CLASS INDEPENDENT PLANT BEING BUILT AT WEATHERFORD, TEXAS.

CONSTRUCTION work on a new plant at Weatherford, Texas, has just been started by the Home Telephone Company. At present the Independent property consists of a 400 drop magneto board. All lines are either grounded or copper return. About 500 subscribers are connected.

Weatherford is the county seat of Parker county, and has a population of 7,500 people. Demands for a high grade Independent service are urgent, and the building of an up-to-date system by the Home Telephone Company will enable the public to receive in a most satisfactory manner the service which it desires. The entire system will be reconstructed; new quarters have been secured, and a complete central energy system will be installed. In the business section of the city wires will be placed underground, and connected with the cables in the conduit system will be aerial cables, making what will be practically an all-cable system, with only enough aerial feeder wires to distribute from terminal to terminal. It is estimated that 40,000 feet of aerial cable, varying in size from 10 pair to 300 pair, will be installed.

The management of the company expects to have the list of subscribers increased to at least 800 by the time the system is ready to be cut over, about September 1. Besides the city service about 50 rural lines will be cut into the switchboard. In Parker county at present nearly 2,000 rural telephones are being operated, and all subscribers wish to be connected with Weatherford, which is the county seat and trading center for these people. Arrangements are now being made not only to care for this large number of people who are at present using the telephone, but also to develop the territory further. It is believed that inside of a year not less than 4,000 country telephones will be in a position to receive connection with one another through the Weatherford exchange. The long distance lines of the Ft. Worth Long Distance Telephone Company will connect the exchange with important cities on all sides.

The company was chartered April 27, 1906, under the name of the Home Telephone Company, with a capital stock of $50,000, divided into shares of ten dollars each. The officers are W. D. Carter, president; E. P. Sawtelle, vice-president; R. Armstrong, secretary, all of Weatherford, Texas; J. C. Casler, treasurer, Fort Worth, Texas. The above, with the following, make up the board of directors: R. S. Lowe, G. A. Holland, C. C. Littleton, J. T. Cotton, all of Weatherford, Texas, and J. A. Murray, of Fort Worth.

TELEPHONE SYSTEM INSTALLED IN CONNECTION WITH CLEVELAND AUTOMOBILE RACES.

THE telephone played an important part in the hill climbing contest that took place under the auspices of the Cleveland Automobile Club on Decoration Day. The course for the aspiring autoists lay over a hilly road in which there are several short turns, and where autoing under any circumstances is accompanied by enough danger to whet the enthusiasm of any driver.

The Gates Mills hill is nearly one mile long and the rise is slightly in excess of 300 feet. The road is not in good shape, as there are gulleys at places and rough surface and rocks at others. The club managers knew there was danger in making any race up the hill against time, and wanted to supply every safeguard that was possible. They accordingly arranged with the telephone company to prepare a system to meet the special service demand of the day.

A line was run up the hill, and a station placed at the foot and at the top of the hill as well as stations at each of the two bad turns where trouble was feared. The upper hill leg of the course could be watched from one of the way stations and the lower leg of the course from the other. There were several roads leading into the one over which the course was run, so these telephone operators were required to be on the lookout, and each driver was informed of what he must expect before he started.

The construction of the telephone system was very simple. There was a station in the paddock. When one driver had finished the course the operator at the uphill station so notified the paddock station and the next man was put in place to start. Then each of the way stations reported if any teams or pedestrians were on the road and when all was made plain the driver was sent away with a flying start to make the hill.

As the driver went over the tape at the start the timer there pushed a button that rang a gong at the top of the hill giving the official timers the exact start. As the driver went past each of the way stations he was reported to the paddock station, and as he crossed the tape at the finish a push button there was touched, causing a gong at the starting line to ring and give a check to the people who were also timing the races at this point. All stations then communicated with the paddock station before another machine was started. As a result of this more than two score machines went over the course during the day at top speed and yet there was not an accident, not a collision, not a thing to mar the pleasure or interfere with the sport. The drivers having accurate information relative to everything on the course felt secure in their efforts to make the best time possible, the result being the establishment of many better records than had ever been made on the hill before.

The members of the club and particularly the drivers were loud in their praise of the fine telephone service furnished and believed that they had discovered the best way of avoiding trouble for their hill climbing and other contests that could be found. They stated that in future meetings they would have special telephone lines established and with them would police the course for the racers.

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QUERIES

DOING AWAY WITH SPARKS AT RELAY CONTACTS —(705).

Will you kindly explain to me if there is any way of preventing fusing of relay contacts due to kick caused by sudden break in the circuit? A. R.

Various methods have been devised, and each has depended to a large extent upon local conditions. In Fig. 705 is illustrated a circuit in which the trouble you mention has been experienced. In this case the circuit which the diagram depicts is a trunking circuit, and it was found that in the normal course of operation a heavy spark passed across the contacts a and b of relay 1, and heated them to the point of fusing. This spark was due to the kick of relay 2, which happens to be so designed that a heavy electric motive force was induced when the circuit through it was broken; that is to say, the current flowing through the negative side of battery B, to contacts a and b, relay 2 and 3, to sleeve of jack, 30 ohms resistance to ground sets up a sufficient magnetic flux through the windings of relay 2 to cause a very heavy electric motive force of self induction to be created. This electro motive force at the moment of rupture sets up a strong current which causes a spark across the gap between armature b and contact a, the path of the current being from relay 2 through the lamp and 24 volt battery B' to ground, and back through ground, battery B', and across the contacts to return to the relay.

There have been proposed two ways of remedying this difficulty. One of these is by cutting a resistance X of 500 ohms across the winding of relay 2. In this case the current due to the kick back of the relay is short circuited through the shunting coil, which actually, of course, has less resistance than the air gap between armature b and its contact. The resistance is so high that it does not shunt the relay sufficiently under the normal condition of the circuit to prevent its proper operation. In order to effect proper operation of lamps the resistance in this event is made 43 ohms, so that the combined value of the resistance in multiple of the windings of the relay 2 and resistance X respectively may be very close to 40 ohms.

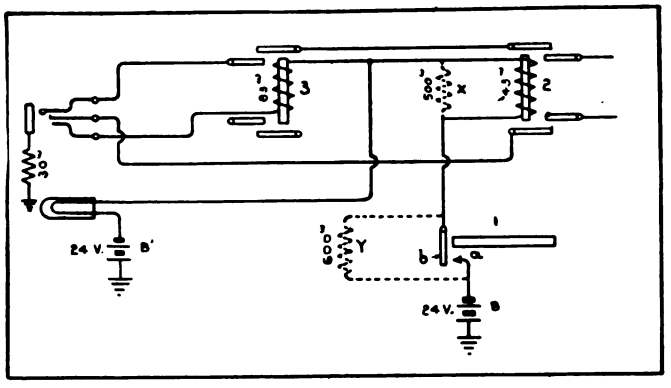

Fig. 705.

Another method which has been devised to do away with the trouble referred to on this same circuit is to connect the resistance as shown at Y directly across the contacts a and b. This short circuits the air gap through resistance, and the current from relay 2 passes through the coil rather than to jump the gap. The resistance of this coil has been established at 600 ohms, as this figure is sufficiently low as to permit current induced by relay 2 to pass through it, while the amount of battery current passing through it to the ground connected to the sleeve of the jack after the opening of contacts a and b is exceedingly small. It has been found that either of these methods gives very fair results, and as the principles are obvious it is possible that they will find a more extended application in other circuits.

TYPE OF RINGING MACHINE FOR FIVE HUNDRED VOLT CIRCUIT—(706).

Will you please explain why it is that, although a dynamotor is very frequently used for supplying a ringing current, you seldom see this type of machine in use upon a 500 volt circuit? J. N. B.

When a machine is to be used upon a 500 volt circuit the problem of insulating its windings properly is a little more difficult than for a machine which receives current from 110 volt mains. This difficulty of insulating against high potential is a little more pronounced when there are two separate sets of windings upon the same armature, such as are found in a dynamotor. The result of a cross between a 500 volt winding and the winding for supplying ringing current to the switchboard is obvious. Not only would the switchboard apparatus be seriously injured in many parts, such as the ringing keys, but the operators would be exposed to great danger. It is therefore considered good practice to take the most thorough measures to provide against such an occurrence, and it is believed by many people that it is inadvisable to wind a 500 volt motor and regular ringing current winding upon the same armature. The usual practice is to use a separate motor and dynamo joined by a shaft having a flexible coupling, making what is known as a motor generator set.

PROTECTION OF STORAGE BATTERIES FROM METALLIC DUST—(707).

I note recent instructions issued for the installation and care of storage batteries state that no metal pipes should be run above the batteries. Will you please explain why this is? N. S.

If a small amount of metal is allowed to fall into the storage battery tank an action is set up which causes the plates to deteriorate very rapidly. When a metal pipe is above the cells the fumes arising from the solution, and an occasional drop of sulphuric acid which may be given off, due to the boiling of the cells at the time they are being charged, come in contact with the metal, causing its speedy corrosion. Draughts of air and jars of the building are very likely to shake loose little scales of metal salts, which drop into the storage cells resulting in the damage referred to above. In many places it is the custom, if the cells are installed in a battery room where pipes have already been run, to box in all metal work in order to avoid any difficulty; but the wiser plan is to do away with the pipes altogether, causing them to take a course which carries them around the room if it is possible. Otherwise, of course, a suitably painted tight wooden box will answer the purpose of keeping all particles of metallic matter out of the cells.

It is well to use black ashpalt paint, as this is not affected by the fumes of the acid.

USE OF CONDENSER ON PARTY LINES—(708).

Why is a condenser sometimes placed in the secondary circuit of a magneto instrument on a heavily loaded party line? J. W.

The condenser is used to enable bells to be rung if one of the receivers is off the hook. On such a line it is a common experience that after one ring has been given several people will listen on the line to hear the conversation. If the desired party does not answer at the first ring subsequent attempts to call him will be useless, owing to the fact that his bell is shunted by one or more receivers which have a comparatively low impedance, thus allowing current from the ringing generator to pass through them instead of the bells.

If a condenser is cut across the line in series with the receivers the impedance to ringing current is raised to a sufficient value to allow the bell to be rung. The added resistance to talking current, owing to the difference in frequency, is not sufficient to be injurious.

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ORGANIZATION IN TELEPHONE WORK.

(*Continued from page 374.*)

every quarter or half year as thought best. This has its merits in that the new construction done during the current quarter or half year can be easily obtained. In a few cases this "Plant" account is divided up into parts such as "Wire Plant," "Exchange Plant," "Sub-station," etc., but the writer has found this unnecessary. If the construction is necessary and authorized it ends there and the only thing gained by such detail would be the ability to determine the proportion of new construction necessary for each section.

It is unnecessary to define maintenance, although there seems to be so much misunderstanding regarding it. The idea as already expressed is that anything which is in the nature of repairs or replacements and has not for its primary object the increase in value of said plant comes properly under this head and no other, hence, labor, clearing trouble, new material for old work, and all the expenses in connection therewith, and the moving of subscribers' telephones to new locations, when not paid for, must come under this head.

The charges which would appear under the head of operation would be wages of operators, including traffic manager, supervisors and each person for local or toll work, employed in the operating room directly or indirectly, with the exception of repairmen; salaries and commissions of agents; stationery for operation purposes, including the directory and all help connected therewith, together with material used, etc.; incidental expense in connection with this department; all power charges for illumination, charging of batteries or ringing purposes; all free and franked business; pole contacts, etc.; in fact any expense dependent on the traffic variation. In the case of the directory and similar expense, such as printing when the purchase extends over more than one month, the balance may be divided up between the several months and so carried as an asset from one month to another until disposed of. A general expense account is usually kept in addition to the foregoing and in it are charged the salaries of the manager, general offices, cashier, clerks, collectors, the expense of this and all other accounts which are not easily divided between the others, such as light, heat, taxes, office supplies, insurance, etc. It is customary to collect all telephone rentals in advance, and on the Pacific coast a new practice has been established which reduces labor and expense. To all telephone rentals is added twenty-five cents, which is deducted if the patron pays by check or at the office of the company on or before the tenth day of the current month. This rule is rigidly enforced and works very satisfactorily, the people seeming to rather enjoy the saving of twenty-five cents by sending check or calling personally. By the tenth of the month it is usually found that about 70 to 75 per cent. of the bills have been paid. There are those who advocate the quarterly or semi-annual method, but while a number do this voluntarily, the majority prefer to pay each month, usually for the reason that the rentals do not accumulate to so large amounts.

It is customary to affix to each a contract a number called and known as the "Contract number," which is indicative of the name and telephone number of the patron or subscriber. These are entered in what is known as the "Lease Record," which is a book about 12½ x 15½ inches, each page carrying twenty-five accounts. The book, like all other records, should be large enough to last one year. These accounts are entered consecutively by their numbers, and when a number for any reason has not been used the line is left blank. When changes are made it is customary to close the account and open a new one. This contract number identifies the subscriber throughout the system, except where the telephone number is paramount. It is well to keep separate records of cancelled and active accounts. This record, as shown in Fig. 2, is self explanatory. The totals of the "still due" column are debited to the "rents receivable" and to the credit of the rentals in the ledger. It is common practice to enter all charges at the beginning of the month and the credits at the end of the month. This book ledger has been supplanted by some companies by the card ledger. When changes take place the lease is marked "superseding" stating the number of the new contract; when taken out the word "discontinued" is used. The following abbreviations are frequently noted to distinguish the class of service: B., business; R., residence; Ex., extension; P. B. X., private branch exchange; I. C., intercommunicating; S., special.

ATTEMPT OF BELL COMPANY TO KILL COMPETITION IN OSWEGO.

(*Continued from page 378.*)

modern switchboard, spent a great deal of money on construction, and began to seek the business of the town by extremely vigorous competitive measures. The directors of the Independent company finally received overtures from the Bell company, which offered to buy up the Independent plant with the object of doing away with competition in this manner. It is said that the offer they received was too tempting to resist, and their company was accordingly sold to its competitor.

The Independent company throughout its entire experience was under the control of men closely identified with the business interests of the town, and its service was satisfactory to the people. The sentiment prevailing in the town is very well indicated by the fact that the manager of the Ontario Company has determined to continue to work in the field of Independent telephony, and with this in view addressed to the president of the company the following letter of resignation:

Mr. F. A. Emerick, Pres. Ontario Telephone Company, Oswego, N. Y.

Dear Sir:—Since the announcement of the traffic arrangement between the Ontario Company and the Bell Company, it has been understood that I was to be retained as Manager, in Oswego.

I have given the matter very careful thought and have decided that should I accept any position with the Bell Company I could not carry on the work with the spirit necessary to be successful, as my sympathy and interests are with the Independent telephone cause.

Please accept my resignation to take effect June 1, 1906.

Thanking you for your many kindnesses, I am,

Respectfully yours, W. A. CLEMENTS.

At the time the sale was made the paid in capital stock of the Ontario Company was $100,000. For the property of this company the Bell company paid $130,000, and assumed a bonded indebtedness of $44,000, making the actual cost to them of the Independent plant in Oswego $174,000. In addition to this the Bell company had expended in Oswego a sum which may be roughly figured at $125,000, and it is said that it now contemplates spending between $50,000 and $60,000 for subways and wire plant. This means that the company will within a short time have invested in a comparatively small city about $350,000. Moreover this investment does not represent a plant in which all the parts are capable of contributing to the support of the company. A great amount of it is duplication, and will have to be junked, so that the money spent for it is a sure loss to the company.

In order to make a fair showing on this enormous investment high rates will have to be charged, or poor service given. In Syracuse Independent development is high, and the company there is equipped for giving first class long distance service. The people connected with the Syracuse company are already participating in arrangements for the organization of a new Independent company in Oswego. When this is accomplished they will be able to erect for $125,000 a plant which will give better local service than the Bell, and trunk lines run only a few miles to Syracuse will give service to a town whose business is most closely connected with that of Oswego, and from this point connections may be had with long distance lines giving service all over the State. The very people who have made at a single stroke 30 per cent. profit on their investment by selling out to the Bell company are arranging to put back their money into the new Independent plant. Thus the Bell company has built one plant; bought another; and the money it paid will be used to build a plant for a third company. This new company will be able to base its rates upon the investment of $125,000 required to put up a first class plant; the Bell company will have to base its rates upon the investment of $350,000.

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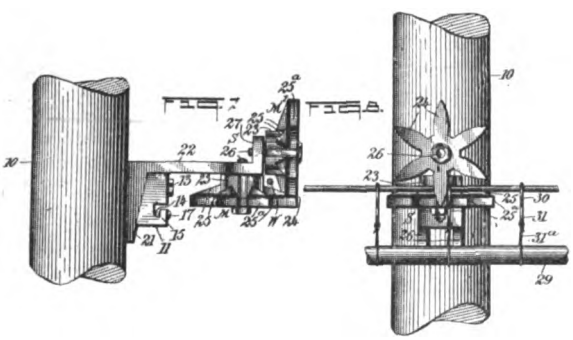
TELEPHONE PATENTS

CABLE SUSPENSION SYSTEM.

Leonard A. McNeil, Maywood, Ill., patents (No. 816,991; dated April 3, 1906; filed September 2, 1904; serial No. 223,083) a cable suspension system.

The object of this invention is to facilitate the erection of aerial cables. For this purpose the inventor employs a special form of hanger, illustrated herewith.

This consists of a block 11, provided with a recess 14, to hold the messenger wire in its final position. Its rear portion J. is reduced to permit the temporary lodgment thereon of a tempo-



rary member 22. This member carries toothed wheels M, M^1, which mesh together at right angles.

In operation the messenger wire W is threaded through the openings between the wheels and fastened at the terminating point in the groove 14. The cable is then attached to the messenger by suitable hangers and pulled into position. As each hanger comes in contact with the teeth of the wheels the latter revolve, maintaining a constant engagement which will not allow the messenger wire to slip out of the desired position.

GROUND ANCHOR.

William E. Cissman, Mount Vernon, Ind., patents (No. 817,044; dated April 3, 1906; filed August 29, 1905; serial No. 276,300) a ground anchor.

In this invention means are disclosed for securing a positive hold upon the earth for the purpose of guying poles or similar uses.

This the inventor accomplishes by a device similar in shape to the letter A. The lower extremities of the legs are bent outwards so as to form holding surfaces to engage the earth. The crosspiece is attached to a rod to which a wire or rod is fastened. In operation a hole is dug and the device lowered into it, with the crosspiece at the base. The hole is then filled with earth. If a strain is now placed upon the rod attached to the crosspiece, it will cause the latter to rise, forcing the arms outwards, and causing the extension surfaces of the legs to engage with the solid earth.

SUPERVISING SYSTEM.

Frank R. McBerty, Evanston, Ill., patents (No. 817,867; dated April 17, 1906; filed January 24, 1902; serial No. 91,031) a supervising system.

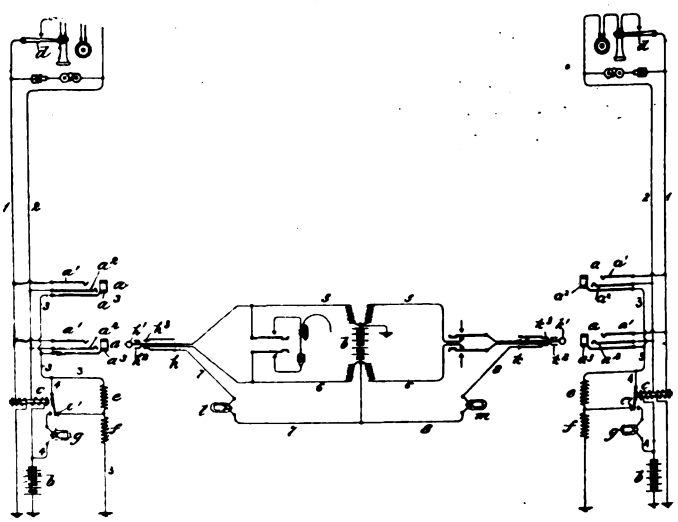
The object of this invention is to provide a means for operating the supervising signals of a cord circuit without the aid of supervisory relays.

Referring to the accompanying illustration the means employed will be made clear.

The line wires 1, 2 include in series windings of the line relay C and battery b. Tip and ring springs a^1 a^2 connect respectively with wires 1, 2. Sleeve or test thimbles a^3 are wired in series to wire 3, and resistances e, f and connect with ground. The armature of relay c is legged to wire 3 by wire 4 and in normal position is in contact with c^1, the circuit thus formed being a shunt around resistance e. The line lamp is shown at g, and the supervisory lamp at b connecting with the sleeve h^3 of the plug and battery b. Tip and ring sides of cord circuit are shown at 5, 6, respectively.

When a receiver is removed from a hook the circuit of the line relay is closed, causing it to attract its armature and thereby lightning line signal g, the circuit being from battery b, over wire 4, lamp g, wire 4, wire 3, resistance e, f, to ground. The line signal 4, is adapted to operate with current flowing through this high resistance circuit. When the operator inserts the answering plug in the jack, the circuit of the supervisory lamp l, which is of low resistance, is placed in shunt with the line signal g, and the latter is extinguished. The supervisory signal does not light because the resistances e, f do not allow sufficient current to pass for its illumination.

When the calling plug is inserted in the jack of a called line the supervisory signal m will be illuminated because the line relay armature is then in contact with c^1 and the resistance e is shunted out. Upon the removal of the receiver from the hook of the called party's telephone the line relay will attract its armature, thereby removing the shunt around resistance e and the



supervisory lamp is extinguished. Upon completion of the conversation the hanging up of a receiver opens the line circuit and the line relay is de-energized. The circuits are then in the same relation as is established after the insertion of a calling plug and before the called party has answered, and the supervisory lamp is lighted, giving a disconnect signal.

The inventor states that the suitable resistance of the various factors which enter into the operation of this circuit may be as follows: Line lamp g 140 ohms, resistance e 75 ohms, resistance f 40 ohms and supervisory signals l, m 37 ohms.

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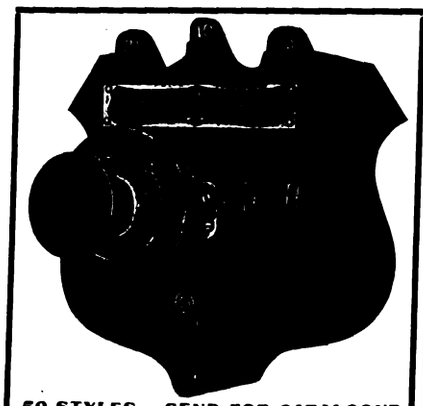


50 STYLES SEND FOR CATALOGUE

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Patent on only simple, positive and practical self-restoring and clear-out drop. Address Box 244, Greencastle, Ind. 627

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—A second hand fifty or one hundred drop switchboard in good condition made by the Sumter Telephone Manufacturing Company. Address F. P. Linder, Hartwell, Ga. 626

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Competent man (married preferred), who is thoroughly capable of handling both business and practical end of telephone plant operating 500 common battery and 200 rural lines. New plant. Position permanent to right party. Salary $65.00 per month for the first year. Right party can secure stock interest in property and the position of Secretary. Address, with full particulars, to Box 619, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 619

WANTED—A young gentleman of good appearance desires position as traveling salesman with good telephone or supply house. Seven years' experience, last four years as superintendent of switchboards for company operating over sixty exchanges. Can give best of references and reasons for wishing a change. Address Box 620, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 620

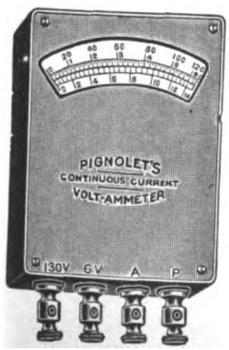
WANTED—Experienced purchasing agent desires position with progressive operating or manufacturing company. Good habits, clean record, excellent references. Address Box 623, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 623

MR. MANUFACTURER, our business is to create and delevop A MARKET FOR YOUR PRODUCT. We can sell your entire output at less expense and risk that you can do it. If you have a good thing but don't know how and where to sell it, write us. Hapgoods Sales Company, 305-309 Broadway, New York, U. S. A. Offices in eight American cities and London, England. 464

WANTED—A young man of experience and ability in telephone salesmanship to represent a large telephone manufacturing company in New York State. Address Box 625, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 625

WANTED—Telephone inspector for telephone manufacturing concern. One familiar with circuits, interior and long distance telephones. Address Inspector, Box 628, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York City. 628

TO BE FOREWARNED IS TO BE FOREARMED



If you are not using a measuring instrument to test your lines, get one at once, as you will need it many times before the summer comes. It would be just as sensible for a grocer to try and sell sugar by guessing at its weight as it is for you to try to locate a fault in a line by the same method. PIGNOLET VOLT-AMMETERS are designed to give the best results required for testing purposes. They are not complicated nor do they require experts to operate them. Another point in their favor is their low cost. There is no instrument on the market which will give you as accurate results at anything near the price. Hadn't you better write for prices and further particulars By buying one now you will save its cost many times over before you have had it a year.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit

78 CORTLANDT ST., N. Y.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A NEW MAGNETO SWITCHBOARD.

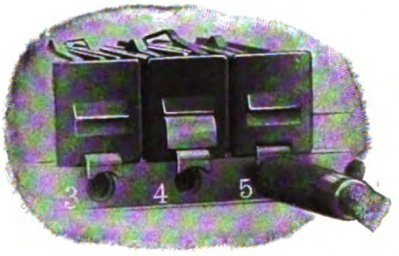

Fig. 1. Front view of three drops for Sumter Unitype Board.

EACH drop in the new Sumter Magneto Switchboard is a separately removable unit, and from this fact the company has decided to call the board the Unitype. It is said to be radically different in design from anything heretofore attempted, and secures the valuable feature of enabling additions to be made exactly as required, doing away with any difficulty of deterioration of apparatus left in idleness in the board. The apparatus may be added when it is ready to go into service, and thus the cost of equipment is not expended until the time when returns for its use begin to come in. Also the difficulty experienced when idle equipment in a board is robbed of some of its parts for repairing apparatus attached to working lines, causing confusion at a later period, is avoided.

Fig. 1 shows the front view of three of the Unitype drops used in this switchboard, while in the opposite column, in Fig. 4, is shown a view of the back of the drops, in which the locking contact springs connecting the drop to the jack are clearly indicated. The drop itself, of which a view is shown in Fig. 2, presents some very interesting features of construction. There are three removable pieces: an armature *f*, shutter *e* and restoring latch *g*. The armature is carefully balanced on a brass rod which runs entirely across the drop frame. This obviates the necessity for pivot screws, which are frequently a serious source of trouble, to say nothing of the annoyance to the repairman who attempts to adjust them. The armature hangs in front of the drop coil *h*. The shutter *e*, which is very light, is held in its normal or unexposed position by the knife edge of the armature, which engages a small projection on the bottom of the shutter. When the armature is attracted the knife edge releases the projection from the lower part of the shutter, and the latter falls back projecting through the slot *l* in front of the drop case, thus attracting the attention of the operator. It is noteworthy that the signal is displayed by the force of gravity alone, thus fulfilling the requirement of a magneto switchboard, that the actuation must take place during the short time that ringing current is passing through the magnet coil. The method of inserting the drops in the board is extremely simple, as no wiring is connected to the drop in any way; it is pushed in by the hand, and proper connections are made through the locking contact springs of the jack. The removal of the drop is, of course, equally easy. The company is making numerous sales of this type of apparatus, and will be glad to give detailed information to any one who will mail a request to the Sumter Telephone Manufacturing Company, Sumter, S. C.

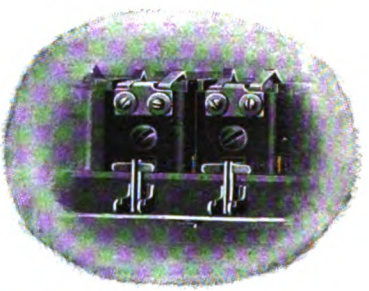

Fig. 4. Rear view of Sumter Unitype Drops.

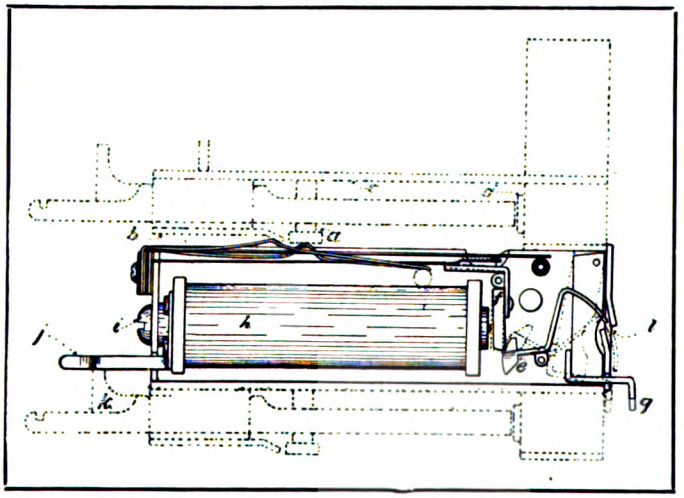

Fig. 2. Sectional view of drop used in Sumter Unitype Switchboard.

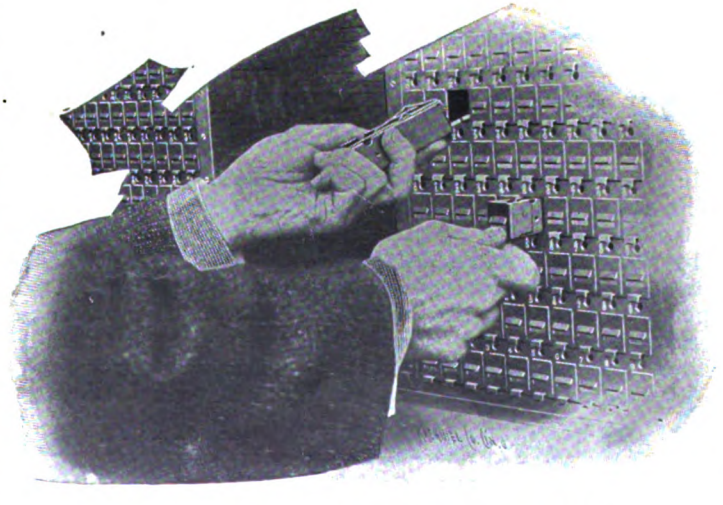

Fig. 3. Method of removing Unitype Drops from Switchboard.

THE SWEDISH-AMERICAN TELEPHONE COMPANY began on May 1st to make shipments of its regular product from the Kansas City branch. Since that date there has been a daily increase in shipments, and at this time the company ships one carload of instruments each week. The Independents in the Southwest were not slow to take advantage of the opportunity offered them, and the Swedish-American Company is to be congratulated on its enterprise and success in this undertaking. It has also recently opened an office at 112 Broadway, Fargo, N. D. This office will be in charge of Mr. C. L. Ward, who will gladly respond to requests for prices and information in the Northwest. Mr. Ward is thoroughly conversant with telephone matters and can therefore appreciate any special requirements which companies may desire to meet.

THE D. & T. ANCHOR COMPANY, La Crosse, Wis., has recently issued a leaflet showing the various types of its well known guy anchor. As this company's business has increased, the demands for anchors for use in special kinds of soil, etc., has grown, and the company has arranged to satisfy them by developing modifications of the standard form to fit each individual requirement. People who are anxious to secure just the right thing should write for this folder, upon which the various types are illustrated and prices given. Any special information desired will also be furnished.

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by applying to same **AVENARIUS CARBOLINEUM WOOD PRESERVATIVE,** tested by the only admissible evidence—30 years' use in any part and climate of the globe.

Standard Wood Preserver of New York Central Lines, American Telephone and Telegraph Company and other large Corporations.

Guaranteed to double the life of poles with proper application. Comes ready for use, anyone may apply it with a brush or by dipping; no skill nor machinery required.

Enables substitution of cheaper grades for expensive poles.

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CARBOLINEUM WOOD PRESERVING CO.

Sole U.S. Agents **Milwaukee, Wis.**

Beware of substitutes offered under similar names for easily discernible reasons.

WE CAN INCREASE YOUR NET EARNINGS

Carefully designed Systems of Records and Accounting will do it. We are specialists in the designing of such systems. No matter how small or how large your company may be, the adoption of our methods will result in pronounced economies.

To enable us to submit you a detailed proposition, mail us a concise statement of the size and scope of your company, and your prospects for growth, expansion, etc. Such information will be received in strictest confidence.

Accompany the information with samples of forms you are now using, stating defects you would like remedied.

Our experts will then submit a sample outfit of Records, Sheets and forms to meet the individual needs of your company.

Write us to-day.

TELEPHONE SYSTEMS DEPARTMENT

THE Edwards-Hine Co.

5-7 PEARL ST., GRAND RAPIDS, MICH.

A Timely Warning

YOU CANNOT **AFFORD** TO WAIT ANOTHER **DAY.** FOLLOW THE **BEST** PRACTICE, DO ALL **YOU** CAN TO **AVOID** TROUBLE.

ONLY ONE OF MANY

"In my judgment, comparing your fuse block with all others on the market, I can say this much, that I have had such tests with it that I am confident it will protect all telephones, where the block is properly installed, from lightning or any foreign currents that the telephone circuit is liable to come in contact with, and at the same time give the **least** trouble on that circuit.

"I surely would not have placed an order with you for 2,000 of your fuse blocks had I thought there was anything in the market that was equal to it, regardless of what the block might cost."

(Name and address on request.)

GIRL IS SLAIN AT 'PHONE BY LIGHTNING

La Russell, Mo., May 31.—Edith Sutton, daughter of T. J. Sutton, a farmer residing east of Stotts City, Lawrence county, was killed by lightning this morning while answering a call over a telephone during a severe electrical storm.

WRITE **TO-DAY** FOR OUR CATALOGUES AND **PRICES** ON THE **"CENTRAL"** PROTECTIVE DEVICES FOR **ALL** TELEPHONE PURPOSES. SAMPLES TO OPERATING COMPANIES FREE.

CENTRAL TELEPHONE & ELECTRIC CO.

Makers' High Grade Telephone Apparatus
Dealers' Telephone Supplies (Exclusively)

ROOM 650 AUDITORIUM, CHICAGO
June National Convention

2131-37 LUCAS AVE., ST. LOUIS, U. S. A.

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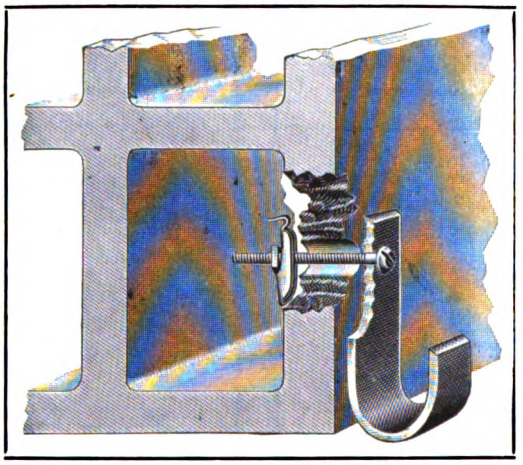
IN THE MANUFACTURING FIELD

A TOGGLE FOR FIREPROOF WALLS.

A NEW device which should be very useful in attaching cleats, telephones or other fixtures to walls has recently been put upon the market by the Electric Appliance Company, 134-140 West Jackson Boulevard, Chicago, Ill. It is especially designed for use in attaching fixtures to walls constructed of fireproof material, such as hollow tile, marble or metal. The accompanying illustrations will show clearly the method of attachment to a bolt, and the way in which, after the insertion of the screw, the tackle flies into a position which enables the fixtures to be firmly held at the turning of the screw. After a small hole has been bored the tackle is inserted as shown in the upper illustration until the loose part drops; all that is necessary then is to pull back the bolt and turn it until the nut holds the apparatus firmly in position. There is no small rivet or other device of limited strength, so that all the parts are properly proportioned. The design is such that pieces of various thickness can be fastened with the same bolts, and the four-inch size will be found to meet the needs of almost any situation. There are, however, ten sizes made, with different finishes, and the company will be glad to send a list showing the dimensions and cost of these different sizes to whoever makes a request for this information.

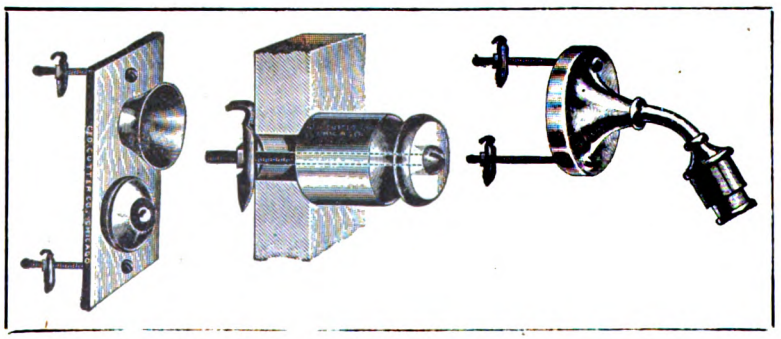


Cutter's Toggle in use on tile wall. Note that thread does not have to be cut off.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, has received from the Covington Home Telephone Company, Covington, Ohio, an order for a four hundred and fifty line Dean express type switchboard. Besides many larger boards which have recently been sold, contracts are being signed daily for one and two position switchboards of the different Dean types.

GOULD COMPANY ORGANIZES TELEPHONE BATTERY DEPARTMENT.

THE rapid increase in sales of storage batteries for telephone service has made it necessary for the Gould Storage Battery Company, of New York, to organize a special telephone battery department. A corps of experienced engineers has been engaged and these men will devote their entire time to this application of the Gould battery. They will not only give attention to securing a proper battery for each order received, but will be glad to give advice to all telephone managers who use this battery, in order that the high efficiency of which it is capable may be fully secured.



Cutter's Toggle attached to bolts fastening various apparatus.

The Gould Company has already had a great deal of valuable experience in supplying batteries for telephone exchanges. Over three years ago the first order for a Gould battery for this class of work was placed by a large telephone company for a trial installation, and this was subsequently followed by orders for similar equipment in six more exchanges. Other companies have followed the lead of the maker of this original order, with the result that the company, as stated, is making special preparations for handling this class of business.

The Gould plate presents numerous points of special interest. It has a large contact surface for active material, which is developed out of the lead of the blank itself by a patented process of spinning the surface of the blank into numerous thin ribs. Only chemically pure rolled lead is employed, and the great density and uniformity which are so valuable in securing the high economy and long life of the Gould cells is thus secured. Owing to the new addition to its organization the Gould company will be equipped to handle technical inquiries, as well as those to its business department, promptly and accurately.

STERLING FACTORY BUSY.

THE Sterling common battery equipment is winning the approval of many telephone exchange managers in all parts of the United States as well as in some foreign countries. The efficiency of the Sterling circuit has long been recognized by practical telephone engineers, but, owing to the fact that a suit had been brought against the Sterling company by the Western Electric company, many orders had been held in abeyance awaiting the final outcome. Now, however, that the patent situation has been cleared up, orders have been pouring in to such an extent that it has become necessary to put on a night shift in the switchboard room in order to keep up with the company's numerous orders.

In addition to the 5,000 line board at Galesburg and the 1,400 line extension to the Toledo board now nearing completion, there are also installations progressing at Uhrichsville, O.; Marion, O.; Lima, O.; Bloomington, Ind.; Belvidere, Ill.; Cedar Rapids, Iowa; Joplin, Mo.; Wichita, Kan.; Hattiesburg, Miss.; Whittier, Cal., and Callao, Peru.

Magneto call boards for Benton, Ky.; Plymouth, Ind.; Millerton, N. Y., and Germantown, N. Y., have been shipped within the last month, the last two being equipped with the new self-restoring drop recently brought out by the Sterling company. This drop, by the way, has received much favorable comment wherever it has been shown on account of its simplicity and excellent mechanical construction, and the Sterling Electric Company expects to receive many orders for boards equipped with this apparatus from small exchanges in the near future.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING CO., Rochecster, N. Y., reports having closed contracts for switchboards for the following places: Exeter, Neb.; Portsmouth, N. H.; Bedford, Ind.; Hartford, Conn.; Rochester, N. Y. Also a 3,000 line multiple board for the People's Home Telephone Company, Morgantown, W. Va., and one for the Marietta Home Telephone Company, Marietta, Ohio. The company also reports many sales of instruments using its new transmitter.

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CORDS : CABLES WIRES

We Manufacture

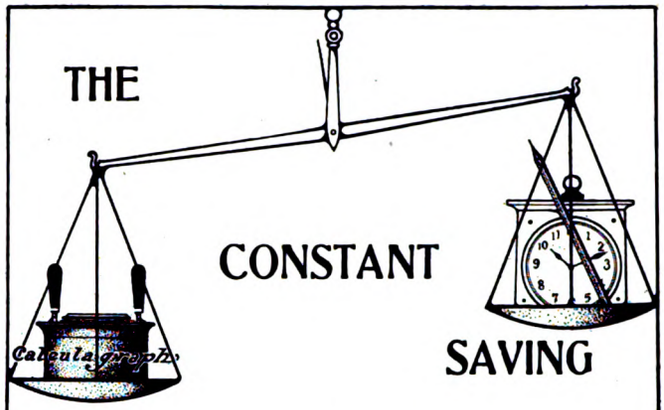
Cords for Telephones and Switchboards : : :
Cables and Wires for Switchboards : : :
Cables for Interior Purposes : : : : :

SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago



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will increase the capacity and earning power of your toll lines.

Automatically times all toll messages *exactly*. Prints time connected and elapsed time on a card. Counts the thousands of overtime charges that your busy operator misses.

SIMPLE EXACT STRONG

It Makes No Clerical Errors

Write for booklet.

The Calculagraph Co.

1437 Jewelers' Bldg., New York City

TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three

Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

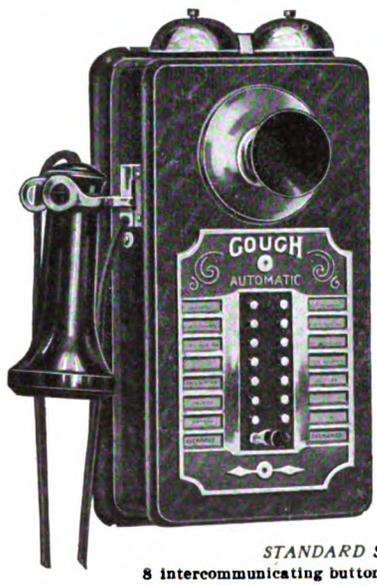
Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company

400 Eddy Street, Sandwich, Ills.

WE HAVE MADE



the installation of intercommunicating systems a logical department of your business by designing and placing on the market an interior system which will give exchange connections.

With the Couch Automatic System you can reach a new class of subscribers and add to your revenues.

Made in styles to fit any business requirements.

Catalogues and full particulars for the asking.

Trunk Button — ***Send for Catalogues***

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange button		
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

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THE WEEK'S MESSAGES

NEW COMPANIES.

BATAVIA, ARK.—The Batavia Telephone Company has been organized with a capital stock of $5,000. The officers are H. L. Routh, president; Dan Sanders, vice-president; Loy K. Butts, secretary; Charles Routh, treasurer. The company will build lines between Lick Branch, Capps, Long Creek and Terrapin.

ANAHEIM, CAL.—The Valley Home Telephone Company is being organized at Anaheim, and will establish a system covering Anaheim, Fullerton, Placentia, Buena Park, La Habra, Garden Grove, Brookshurt, Yorba, Benedict, Miraflores and Claire. George and Robert Dunn, of Anaheim, and Mr. Hubbard, of Redlands, are interested in the organization.

HOLYOKE, COL.—The Phillips County Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are S. S. Wooley, A. C. Cauble, E. E. Wooley, Holyoke, Col.

SMITH GROVE, ILL.—The Smith Grove Mutual Telephone Company has been organized with the following officers: Joseph Brown, president; Mr. Potthast, vice president; Wallace Ulmer, secretary; D. Smith, treasurer. The company is to build a line to Greenville, and will connect at that point with the Bond County Telephone Company's lines.

BLUFF CREEK, IOWA.—The Bluff Creek Telephone Company has been organized and will have connections at Eddyville.

COUNCIL GROVE, KAS.—The Council Grove Mutual Telephone Company has been incorporated with a capital stock of $10,000.

EUREKA, KAS.—The Salem Mutual Telephone Company has been incorporated with a capital stock of $5,000.

JEFFERSON, KAS.—The Montgomery County Farmers' Mutual Telephone Company has been incorporated with a capital stock of $6,000.

MOLINE, KAS.—The Boston Telephone Company has been incorporated with a capital stock of $1,760.

DAWSON, MINN.—The Town & Country Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are Albert Ewing, Peter Bergh, Andrew Grande, of Dawson.

DUNNELL, MINN.—The Farmers Telephone Company has been incorporated with a capital stock of $10,000.

GREENBUSH, MINN.—H. Fant, of Thief River Falls, Minn., is to establish a telephone exchange at Greenbush.

TYRONE, MO.—The Tyrone Local & Long Distance Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are H. P. Clarke, G. C. Clarke, C. L. Clarke, A. J. Hughes, F. B. Healey, J. W. Wartenbee, Henry Parks, H. L. Huber and K. W. Huber.

HATTIESBURG, MISS.—The Home Telephone Company has been incorporated with a capital stock of $150,000. The incorporators are G. B. Luck, L. J. Wetsel, H. A. Jones, W. H. Dean and H. S. Stevens. The company will construct long-distance lines to the adjacent cities.

VIRGINIA, MO.—The Charlotte Telephone Company, with headquarters at Virgina, has been organized. The incorporators are Judge J. W. McFadden, James Crooks and Geo. Thompson. The company will build lines in throughout Charlotte and other townships.

OMAHA, NEB.—A new Independent telephone company has been organized at Omaha. The company will be known as the Omaha Home Telephone Company and has a capitalization of $2,000,000. The incorporators are J. E. Baum, F. B. McPherson, F. W. Judson, C. J. Greene, W. C. Bullard, N. P. Updike, H. H. Balridge, of Omaha, and G. E. Woods, of Lincoln.

BRANDON, N. Y.—An Independent Telephone Company has been organized in Brandon under the name of the People's Telephone Company. It will take over all the telephone properties in Brandon.

MONROE, N. C.—The Union Telephone Company has been incorporated with a capital stock of $2,400, which may be increased to $25,000. The incorporators are T. L. A. Helms, J. N. Price, J. D. Hemby and others.

GROVER HILL, OHIO.—The County Home Telephone Company, Grover Hill, has been incorporated with a capital stock of $2,500. The incorporators are J. M. Hutchison, D. D. Bailey, F. M. Saum, C. T. McClure, S. W. Strock and Joseph Bowman.

PATTERSONVILLE, O.—The Farmers Mutual Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are W. D. Cassidy, John Shankleton and others.

ANADARKO, OKLA.—The Tonquawa Telephone Company has been incorporated with a capital stock of $40,000. The incorporators are Thomas Updegrove and others.

GAGE, OKLA.—The Farmers Rural Telephone Company has been incorporated with a capital stock of $5,000.

RINGWOOD, OKLA.—The Ringwood & Pleasant Valley Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are W. O. Smith and others.

YUKON, OKLA.—The West Point Mutual Telephone Company, of Yukon, has been incorporated with a capital stock of $2,170. The directors are A. C. Deming, J. S. Brass, O. D. Gardner, W. C. Gillespie and Lyman Allard, all of Yukon.

COYLE, OKLA.—The Coyle Telephone Company, of Coyle, has been incorporated with a capital stock of $5,000. The incorporators are O. L. Jewitt, C. L. Minnish and G. H. Stagner.

JONESTOWN, PA.—An Independent telephone company has been organized at Jonestown, with connections at Grantville. The officers are A. S. Rank, president; J. R. Mader, secretary; Samuel Fry, treasurer; directors, A. S. Ulrich, J. A. Bomgardner, Thomas Bomgardner, Samuel Ulrich and E. E. Shirley.

LUTHERSBURG, PA.—The S. U. B. Telephone Company, Luthersburg, Pa., has been incorporated with a capital stock of $10,000.

MOUNT AIR, PA.—The Mount Air Telephone Company, Mt. Air, Lawrence County, Pa., has been incorporated with a capital stock of $5,000. The directors are: E. W. Dungan, Mt. Air; W. L. Douglas, Enon Valley; James Kelson, Moravia; William Fullerton, Edinburg; S. D. Kyle, Moravia.

INDIAN MOUND, TENN.—The Indian Mound Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are J. B. Lahiff, H. B. Smith, J. I. Tippit, C. A. Moery and C. N. Keatts.

OOSTBURG, WIS.—The Oostburg Telephone Company, Oostburg, has been incorporated with a capital stock of $3,000. The incorporators are Garrett J. Huibregse, S. E. Huibregse, and Edward Was.

FRANCHISES.

RED LAKE FALLS, MINN.—The Tri-State Telephone Company, of Minneapolis, has applied for a franchise to run a long distance line through Red Lake Falls.

FARMER, MO.—J. W. Henderson and others have been granted permission to build a telephone line from Farmer to Curryville.

SUBURBAN, MO.—The Suburban Telephone Company, Suburban (Station St. Louis), Mo., has been granted permission to construct a telephone system at Webster Groves. The company will connect with the Kinloch lines and make a strong fight against the Bell Company, which has heretofore held the monopoly in this territory.

CENTRAL CITY, NEB.—The Chapman Telephone Company, of Chapman, has applied for a franchise in Central City, having refused to connect with the Nebraska Telephone Company.

DELPHOS, O.—The Farmers' Mutual Telephone Company has been granted a franchise to construct and operate a telephone system in Delphos.

BEAVER FALLS, PA.—The Beaver County Telephone Company has been granted a franchise at Beaver Falls.

BIG STONE, S. D.—The Grant County Telephone Company, of Millbanks, S. D., has been granted permission to construct and operate a telephone system at Big Stone, S. D.

DALLAS, WIS.—The Farmers' Telephone Company has been granted a franchise at Dallas.

FINANCIAL.

CORNELL, ILL.—The Cornell Telephone Company, Cornell, has increased its capital stock from $8,000 to $10,000.

HEBRON, ILL.—The Farmers' New Era Telephone Company is considering the advisability of increasing its capital stock from $30,000 to $50,000.

MASCOUTAH, ILL.—The Looking Glass Prairie Telephone Company has increased its capital stock from $2,500 to $10,000.

MADELIA, MINN.—The Madelia Telephone Company has recently declared a 6 per cent. dividend.

SANDUSKY, O.—The Sandusky Telephone Company has increased its capital stock from $75,000 to $200,000.

COMBINATIONS.

JASONVILLE, IND.—Geo. F. Hossay, of Indianapolis, Ind., contemplates the purchase of the Home Telephone Company at Jasonville, Linton, Bloomfield and Dugger.

TROY, N. Y.—The Johnsonville Telephone Exchange and the Easton Telephone Exchange, formerly operated in connection with the Hudson River (Bell) Telephone Company, have become a part of the Commercial Union Telephone Company, of Troy.

TOWER CITY, N. D.—Messrs. More & O'Neil have secured an interest in the Tower City and Wheatland telephone exchanges.

ELECTIONS.

BLAKELY, GA.—The stockholders of the Blakely Telephone Company has re-elected A. G. Powell, president; Wade H. Powell, vice-president and

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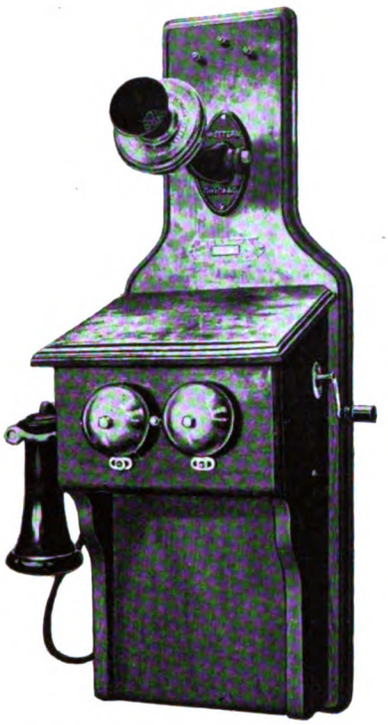

Bridging Telephone.—Type M.
This style of cabinet also made into:
3-Bar, Series, Type "K"
4-Bar, Bridging, Type "L"
with any ringer resistance desired.

Western Pioneer Telephone

Five-Bar Bridging

Our **New Western Pioneer** telephone can be furnished for all classes of **special service** such as **ring through, non-interfering, divided circuit, central checking party line** and in fact can be used where any generator call telephone is now being used. The apparatus used in this instrument is of **New Western design.**

The **common battery type** of **magneto telephone** is becoming popular. The cabinet is compact and neat in appearance, all parts are **conveniently** mounted, the wiring is simple and the cabinet will accommodate a **three, four or five-bar generator.** We manufacture all of the parts used in this instrument. When the upper compartment is open the generator, ringer, hook switch, induction coil and receiver binding posts are exposed. When the battery box is removed by sliding downward, the batteries and battery connections are exposed.

WRITE FOR OUR GREEN BOOKLET

WESTERN TELEPHONE MFG. CO.

"The Pioneer Independent Telephone Factory"
Established 1893

58 W. Jackson Boulevard, Chicago

THE STANDARD "HEMINGRAY"

All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.
Established 1848

WHAT'S IN A BATTERY?

By any name other than the Rock Island, a battery will not *last* as long or give such *enduring satisfaction.*

The ROCK ISLAND NEW PATENT DRY CELLS

are now being largely used by manufacturers of telephone and telephone companies. They *demand* the best and *know* the best. That's why our Standard No. 8—the largest battery we make—has scored so heavily. It will certainly do *all* the work required and possesses a *source* of

CURRENT THAT CAN BE RELIED ON

Our Standard No. 6 is big enough for general purposes. The Rock Island has stood *every known test*—competitive and exhaustive—and shows 20 to 30 per cent. greater efficiency and longer life than any other dry battery.

Write Department D for prices.

At the National-Interstate Telephone Association at the Auditorium Hotel, Chicago, Ill., June 25-28, the Rock Island Battery exhibit in Room 136, parlor floor, will be worth a visit. COME. This invitation is for YOU.

Rock Island Battery Co.

Ninth and Sycamore Streets
CINCINNATI, O.

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THE WEEK'S MESSAGES

general manager; Kathleen Odum, secretary and treasurer. John W. Strickland was appointed superintendent.

PERSONAL.

J. H. AINSWORTH, formerly manager of the exchange of the Central Union Telephone Company at Columbus, Ohio, has resigned to become general manager of the Home Telephone Company at Dayton, Ohio.

JAMES W. BOWLING has been appointed manager of the exchange of the Iowa Telephone Company at Fort Madison, Ia.

JAMES R. CARTER has been promoted to the management of its exchange at Kearney by the Nebraska Telephone Company.

HAROLD R. FARNHAM has been promoted from the management of its Hingham exchange to that at East Boston by the New England Telephone and Telegraph Company.

PERCY N. FULLER, formerly in charge of the Charlestown office of the New England Telephone and Telegraph Company, has been promoted to the management of the exchange at Newton, Mass.

A. L. JOYNES, who has been in charge of the Cumberland Telephone Company's exchange at Paducah, Ky., has been promoted to the management of a new district including the exchanges at Princeton, Eddyville, Kutawa, Paducah, Mayfield, Fulton, Bardwell, Wickliffe, Hickman and Clinton, with headquarters at Paducah.

W. H. WALLACE has been appointed manager of the exchange of the Wood County Telephone Company at Bowling Green, O.

B. C. WOLVERTON has recently been appointed chief engineer of the Hudson River Telephone Company. He will also retain the position of chief engineer of the New York & Pennsylvania Telephone and Telegraph Company, the Central New York Telephone & Telegraph Company, and the Empire State Telephone & Telegraph Company. The combined extent of territory covered by these companies includes 55 counties, with numerous important cities.

MISCELLANEOUS.

TOLEDO, O.—The Toledo Home Telephone Company has recently secured a group of large branch exchange contracts. These include one order from the De Vaux Hotel for 100 telephones. Wiring for lines to the 900 shops and offices in the sixteen-story Nicholas building is in progress.

ROCK HILL, S. C.—Paul Workman, owner of the local telphone exchange, is to install a new exchange at this city. The system is to be rebuilt and extended.

MENOMONIE, WIS.—The Menomonie Commercial Club is endeavoring to connect all local Independent companies in Dunn county with the exchange at Menomonie.

New Construction in the Field

BLACK SPRINGS, ARK.—The Black Springs Telephone Company is to build lines from Caddo Cove to Hot Springs, as well as to many other points in Clark and Pike counties.

SAN PEDRO, CAL.—The Home Telephone Company is to make many extensions to its system.

DELTA, COLO.—The Delta Co-Operative Telephone Company is to extend its system.

KEY WEST, FLA.—The Florida East Coast Railway is constructing a telephone line from Miami to Key West.

BROXTON, GA.—The Broxton Telephone Company, which has recently passed into new hands, is to make many improvements in its system.

DAVIS, ILL.—The Davis Mutual Telephone Company is to build a line to Durand.

MULBERRY, ILL.—The Farmers Mutual Telephone Company is building a line from Mulberry Grove to High Bluffs.

COLUMBUS, IND.—The Citizens Telephone Company is to rebuild its system at North Vernon.

DAVIS, INDIAN TERRITORY.—The Davis & Turner Falls Railroad Company is constructing a telephone line to Turner Falls.

STRATFORD, IOWA.—The Independent Telephone Company is to build a new line south of the city, also one east.

PADUCAH, KY.—The Home Telephone Company, of Paducah, is making extensive improvements both in its local and long-distance service.

SHERBORN, MASS.—The Sherborn Telephone Company is building a new line.

SARANAC, MICH.—The Citizens Telephone Company is extending its lines in Saranac and Berlin.

GLENCOE, MINN.—The McLeod County Telephone Company is to rebuild its system at Glencoe and is to make many extensions.

HECTOR, MINN.—The Hector Telephone Company is building a line to Brookfield.

MADELIA, MINN.—The Madelia Telephone Company is about to build a number of rural lines.

PERHAM, MINN.—The Perham Telephone Exchange is to extend its lines.

LAUREL, MONT.—The Mutual Telephone Company is erecting a line from Laurel to Columbus. It will also build a line to Junction.

SPEED, MO.—The Speed Telephone Company is making many improvements in its system.

ASHLAND, NEB.—The Ashland Telephone Company is making many improvements in its system.

PALMER, NEB.—The Independent Telephone Company is putting in a long-distance line from Palmer to Grand Island.

DOLGEVILLE, N. Y.—The Interstate Telephone Company is making many improvements in its local system.

PULASKI, N. Y.—The Black River Independent Telephone Company is to construct a number of rural lines.

RUSH, N. Y.—The Inter-Ocean Telephone Company is building a line in Rush, N. Y.

TRUXTON, N. Y.—The Truxton & Cuyler Telephone Company is constructing its system.

MANDAN, N. D.—C. E. V. Draper is to erect a telephone exchange at Mandan.

CHARDON, O.—The Chardon Telephone Company expects to build a line from Chardon to Cleveland.

LAWRENCE, O.—The Lawrence Telephone Company is to thoroughly overhaul and renew its system.

MEDINA, O.—The Medina County Telephone Company will establish a new exchange at Sharon.

NEW LEXINGTON, O.—The Citizens Independent Telephone Company is constructing its system throughout Perry County. The company expects to cover the entire county, erecting exchanges in all the larger towns.

SIDNEY, O.—The Sidney Telephone Company expects to extend its system.

TOLEDO, OHIO.—The Toledo Home Telephone Company is planning to install exchanges in a couple of towns near Toledo.

ORBISONIA, PA.—The Orbisonia Telephone Company is to extend its lines from Orbisonia to Mt. Union and from East Waterford to Port Royal.

YORK, PA.—The York Telephone Company is to expend about $300,000 in improving its system.

GARY, S. D.—The Gary Telephone Company is building a metallic line to Burr, Minn., and contemplates the construction of several rural lines.

GROTON, S. D.—The Groton Ferney Telephone Company is to extend its lines to Farmington and Bath. It will also build a number of lines in the vicinity of Warner.

VERMILION, S. D.—The Vermilion Telephone Company, Vermilion, S. D., has commenced the construction of its system.

CELINA, TEXAS.—The Celina Telephone Company is installing a new exchange.

CORSICANA, TEX.—Substantial improvements and extensions are being carried on by the Corsicana Telephone Company.

WEATHERFORD, TEXAS.—The Home Telephone Company will install a new, modernly equipped central energy plant and will make many other improvements in its system.

CASTLEDALE, UTAH.—The Eastern Utah Telephone Company is to extend its lines to Emery.

PARK CITY, UTAH.—The Independent Telephone Company expects to extend its lines to Brighton, Wabash and New York.

SALT LAKE CITY, UTAH.—The Utah Independent Telephone Company contemplates building lines to Mammoth and Robinson. The company is also to establish an exchange at Eureka.

KIRKLAND, WASH.—The Kirkland Telephone Company is building a line to connect Houghton, Kirkland, Juanita, Redmond and Bellevue.

WENATCHEE, WASH.—The Farmers' Telephone and Telegraph Company is to build a line to Leavenworth.

MORGANTOWN, W. VA.—The People's Telephone Company is to install a new exchange at Morgantown.

WHEELING, W. VA.—The National Telephone Company, which has acquired the Phoenix lines of Steubenville, is to rebuild that system. The company will also build lines to Toronto, New Cumberland, and will rebuild the line between Mingo and Wintersville.

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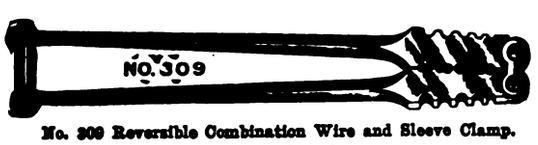

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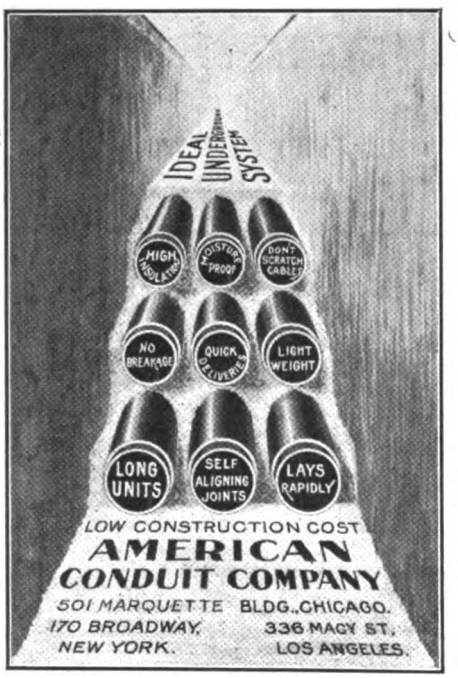

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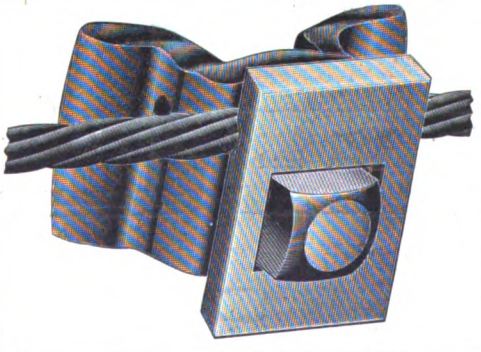

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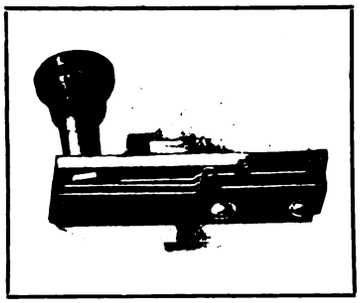

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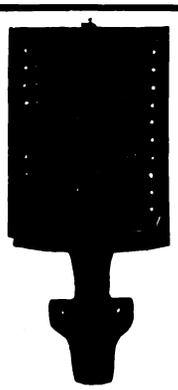

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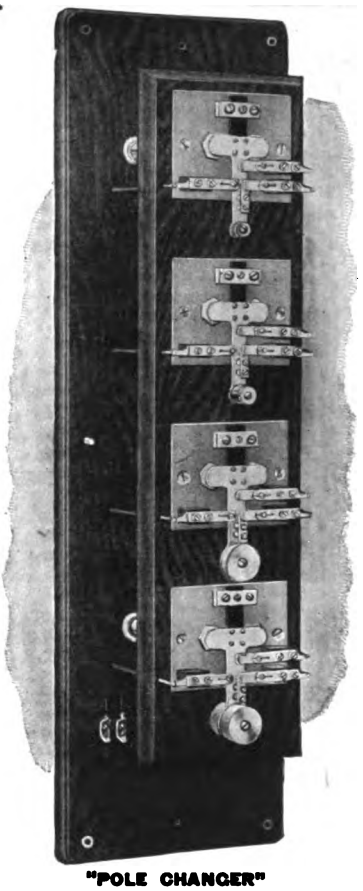

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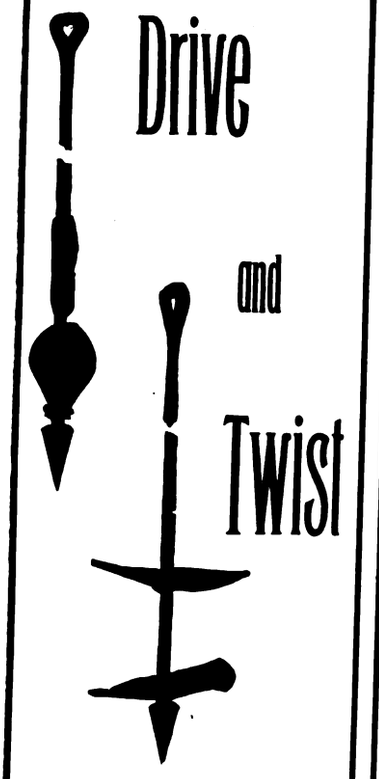

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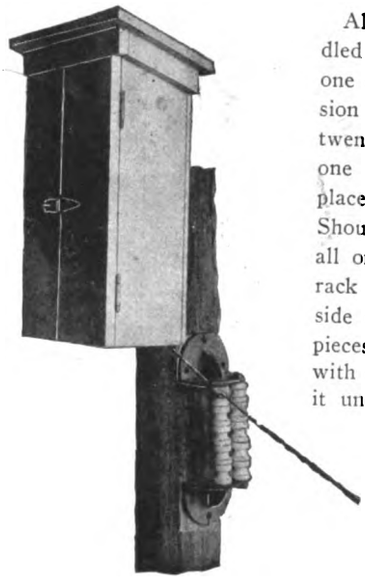

All drops can be easily handled either by placing rack on one or both sides as the occasion demands. In case of twenty drops equally divided, one ten pair rack would be placed on each side of pole. Should the twenty drops be all on one side, a twenty pair rack would be placed on that side of pole. Top and lower pieces heavy malleable castings with convexed surface, making it unnecessary to gain pole.

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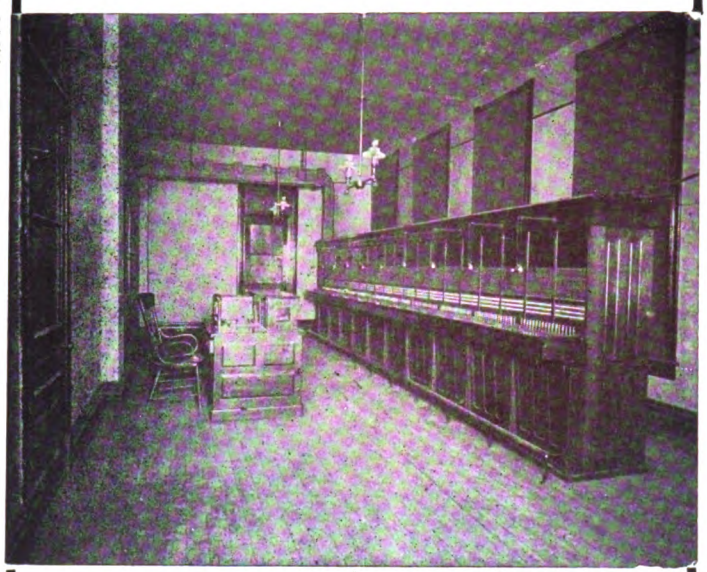

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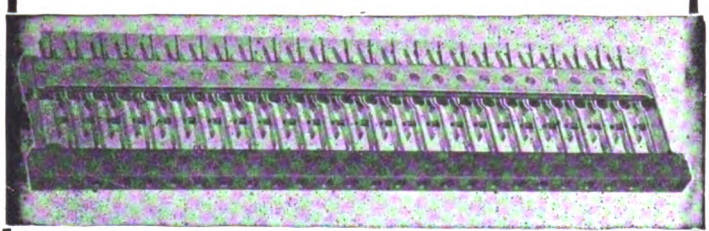

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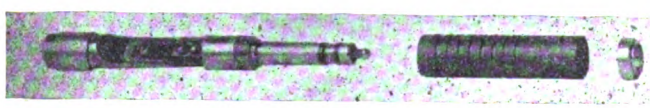

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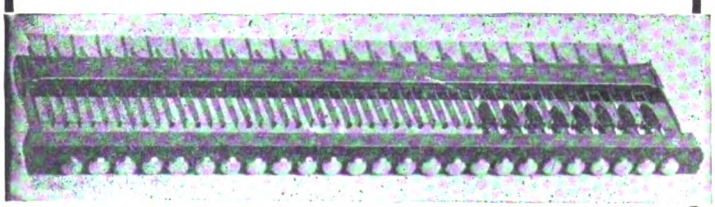

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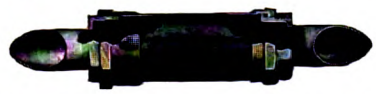
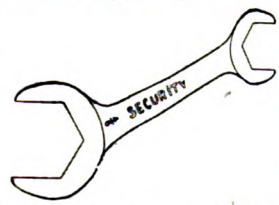


solutely watertight. It is economy to buy them. OUR NOVELTY SLEEVES are made straightaway, two way and three way. Bulletin No. 125 tells all about their ease and convenience of installing. Alteration quickly and readily made and can



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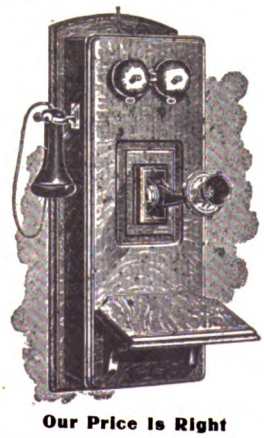

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with all connecting wires, binding posts and terminal screws fully concealed

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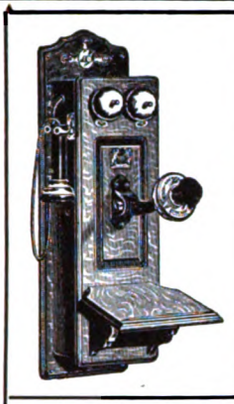

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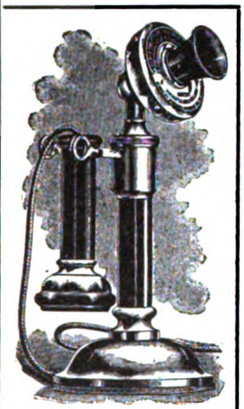

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this year you should bear in mind **Room 612,** where our exhibit will be located. If you do not attend the convention, do the next best thing and ask for our literature.

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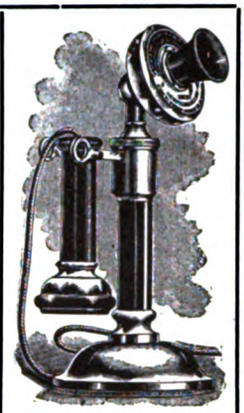

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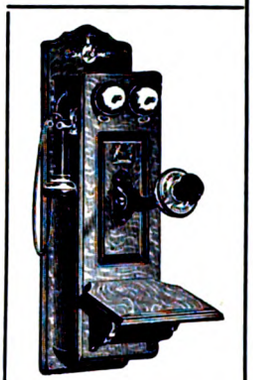

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INVITE YOU TO VISIT THEIR

Exhibit, Suite 604-606, The Auditorium Hotel

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National-Interstate Independent Telephone Association Convention at Chicago, June 26th, 27th and 28th

They will be pleased to receive at either place the delegates and visitors to the Convention for the purpose of demonstrating the Automatic Telephone System

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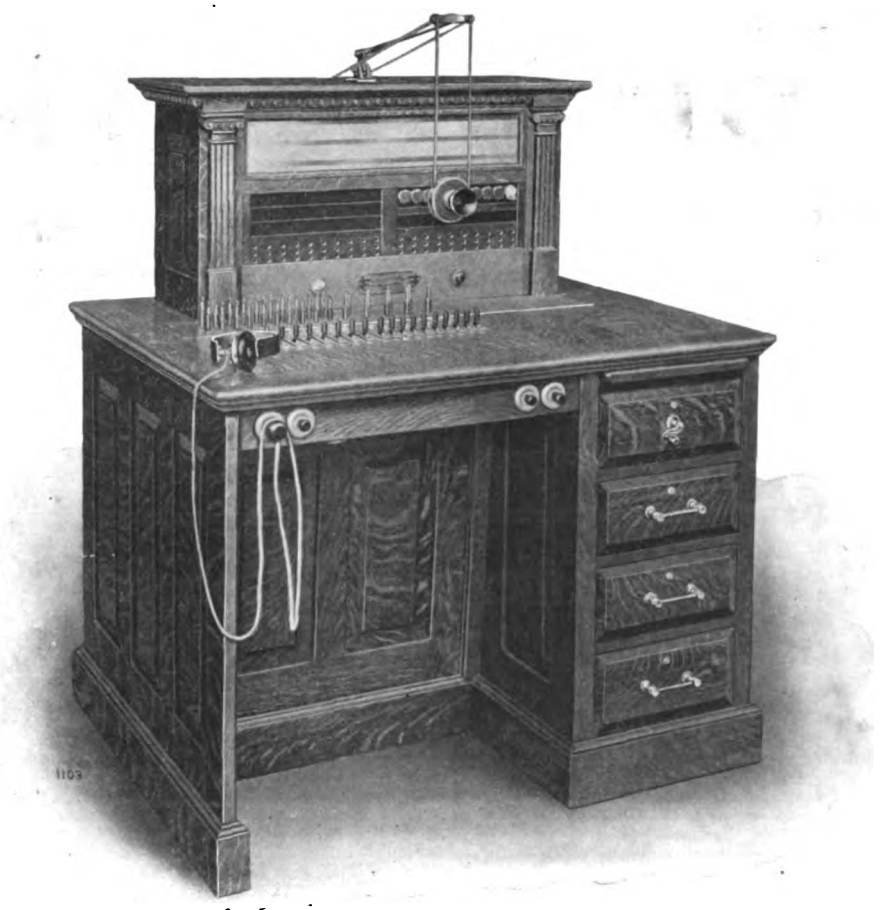

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We invite you to look into and consider this very profitable branch of the business, and solicit your inquiries.

Write at once for Bulletin 14-B.

STROMBERG-CARLSON TELEPHONE MFG. CO.

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WE MAKE CABLE

DIVIDENDS

on telephone stock are difficult to pay unless the service is reliable and the cost of maintenance low. Open wire construction is exposed to a multitude of dangers; everything from the stone of the small boy to the sleet storm that snaps poles and breaks wires, wrecking the system in a few hours.

Many telephone companies have realized this, and to cut down maintenance expense, thus enabling the payment of dividends, they have substituted cable for their open wire plant.

Isn't it time you thought of doing so too? As an illustration, take the experience of Mr. F. G. Broad, Manager of The Union Telephone Company, of Sidney, N. Y. In a recent letter to us he expresses his satisfaction with the improvement that followed the substitution of cables for open wire construction. Here is what he writes:

SIDNEY, N. Y., March 20, 1906.

STROMBERG-CARLSON TEL. MFG. CO.,
Rochester, N. Y.

Gentlemen:—

With reference to your inquiry regarding our experience with cable as compared with open wires, would say that the cable is much more satisfactory. We had an exchange in Unadilla with about sixty subscribers and all open wires; there was hardly a day passed but what we had a case of trouble.

Last October, we installed cable and to-day we have 117 'phones and have had less than a half dozen cases of trouble since that time. About the same thing may be said about our Sidney plant.

I would strongly advise the use of cable even in very small towns.

I am, yours respectfully, F. G. BROAD,
Mgr. Union Telephone Company.

The Manager looking for results: reliable service, low maintenance, should appreciate the value of cable. Let us send you booklet 79B, telling how our cable is made, and giving other interesting cable information.

STROMBERG-CARLSON TELEPHONE MFG CO.

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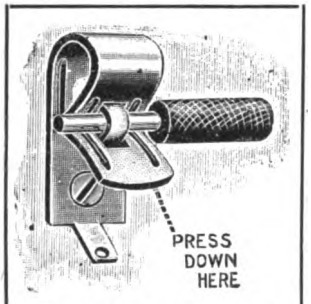
Every Wire Connection



No. 5—Spring Binding Post.

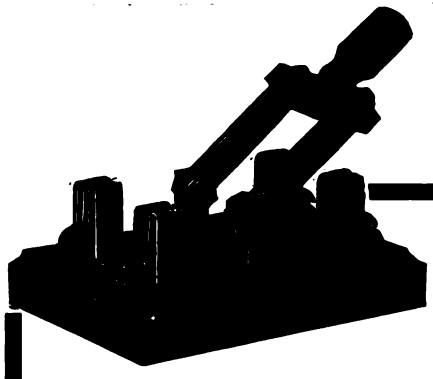
in the exchange, or at the subscriber's station is better made with

Fahnestock Spring Binding Posts

than in any other way.

Our **NO. 5 POST** illustrated this week is fitted with a lug to which the wire is soldered. This post will take receiver cord tips or wire of equal or smaller size. It is used also for operators' transmitter cord tips, for attaching battery and ringing leads to the switchboard, and many other purposes. We will make special posts from your suggestions. Write us. The Fahnestock is the standard binding post for batteries. Write for sample and prices.

Fahnestock Electric Company
129 Patchen Avenue, Brooklyn, N. Y.



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in an efficient and economical manner install

TRUMBULL ALL COPPER SWITCHES

in series with the line at the sub-stations. Then when a thunder storm is imminent the subscribers open the circuits. If the switch is placed between the lightning arrester and the line, many a tedious trip to clear grounds will be obviated and consequently the maintenance charges will be reduced.

Trumbull switches are the only ones which should be used for this purpose, as they possess mechanical and electrical advantages not found in any other type.

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Canadian Cedar Poles

Are Stockier and Last Longer Than American Cedar

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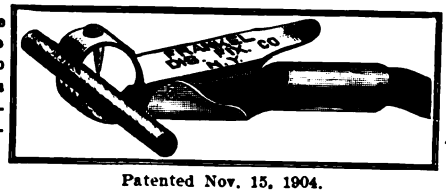
Frankel's Electric Testing Clips

TIME, LABOR AND MATERIAL SAVERS

No more baring the wires. No lineman's grip complete without them.



Sample doz. $1.50 doz.
Lots of 100, $11 hundred
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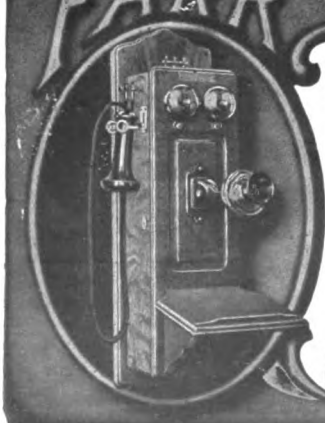

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The American Telephone Journal

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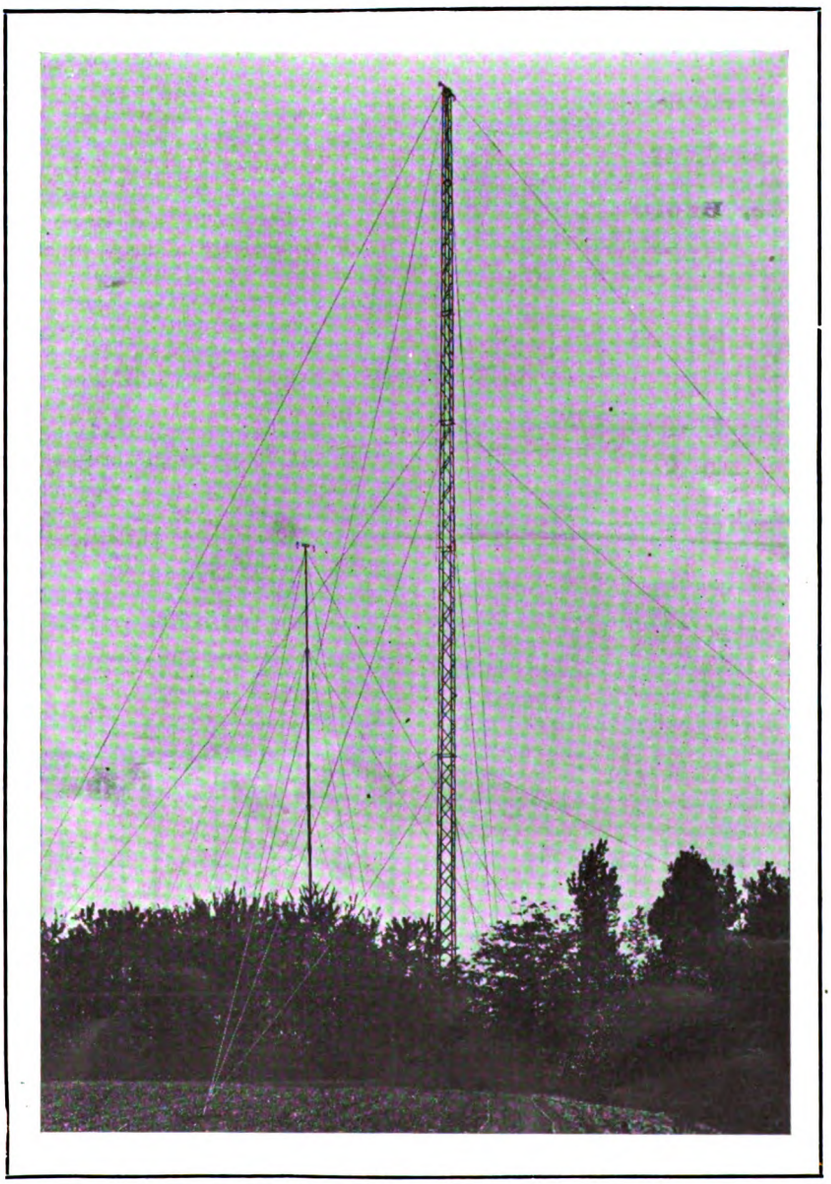
VOLUME XIII *SATURDAY, JUNE 16, 1906* *NUMBER 24*

An Ohio River Crossing

By P. S. Pogue.

THE taking of wires across a river is one of the most interesting features of line construction which occupies the attention of a telephone engineer. In many parts of the country different methods have been adopted, and various requirements have been introduced to correspond to local conditions. The accompanying illustration shows a view of two such crossings built by two different companies in taking wires across the Ohio River. The structure which is in the foreground belongs to the Independent Long Distance Telephone and Telegraph Company. It is on a line connecting Owensboro, Ky., with Rockport, Ind., which branches off the main Louisville - Owensboro lead two miles east of Owensboro, and runs by way of Powers, Ky., to the Ohio River, which it crosses to Rockport. The line carries two metallic circuits; one No. 10 B. & S. gauge for long distance service; and one No. 12 B & S. gauge for local service. At the river is located a pole of structural steel 135 ft. high. As on the Rockport side there is a 100 ft. bluff of solid rock it is unnecessary to put up so high a structure, and here a 90 ft. pole has been erected. The length of the span is 3,200 ft., and the Independent Long Distance Company for crossing this broad space has substituted for the regular wires two circuits of No. 10 galvanized plow steel wire. These circuits are working constantly, and are very busy at all times. On account of the length of the span some trouble was experienced in getting the proper amount of slack in the line, but at last, through experimenting, it has been so adjusted that it works very satisfactorily. The thing essential for maintaining a long crossing free from trouble seems to be to have plenty of slack in the line, and that the dead end pole, that is the pole behind the tower, to which the wires are tied, should be securely guyed in every direction, so as to be absolutely rigid. In this way the only motion communicated to the wires is of a rather uniformly varying nature, due to the rise and fall of the strength of the wind, and the movements of one wire corresponds to those of the other. With a pole less securely guyed the occurrence of violent shakes or jars takes place with every sudden gust, and the effect of this is much more to be feared than that of a steady pressure.



View of 135-foot Structural Steel Pole of Independent Long Distance Company, with Pole of Cumberland Telephone Company Showing Beyond.

In the illustration it will be observed that guy wires are run from three separate points along the pole, thus giving sufficient rigidity to the high structure to resist the severe strains which are at times placed upon it. As the surroundings are comparatively open the full benefit of the impression which should be produced by so high a structure for the carrying of telephone wires is gained. The latticed construction which has been used in some European cities especially on account of its pleasing appearance, also provides ample strength with a small proportionate weight. This is necessary, as in the future this pole will have to bear a considerable number of additional circuits.

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Organization in Telephone Work*

By P. Kerr Higgins.

ALL fixed charges, such as bond interest, depreciation, etc., do not as a rule come under the head of the cashier's department, but are generally taken care of by the general manager or the secretary of the company. The same rule applies to such special expense as right of way franchises, negotiating sale of bonds, discount on bonds, etc. In the payment of employees of departments, excluding the heads, who are usually paid on a separate voucher, it is customary to pay by pay roll. This pay roll is made up by the head of the department, his time-keeper or his clerk, and "O. K.'d" by the head of the department, from whom it is passed to the general manager or his deputy, who approves it for payment. A common practice is to pay bi-monthly, on the third and eighteenth. This gives three days for making up the roll and prevents men from leaving with less than three days' notice.

As previously explained, while depreciation does not come directly under the heading of accounting it will not be out of place at this time to draw attention to its importance. The tendency of companies as a rule is to keep the allowance of depreciation down to the lowest possible amount, which the writer thinks is a grave mistake. It is his opinion that it should be assumed that the plant is practically renewed every ten years, and this being so, one should of necessity allow not less than ten per cent. for depreciation. It is admitted that certain parts and divisions of the plant deteriorate much faster than others, but ten per cent.

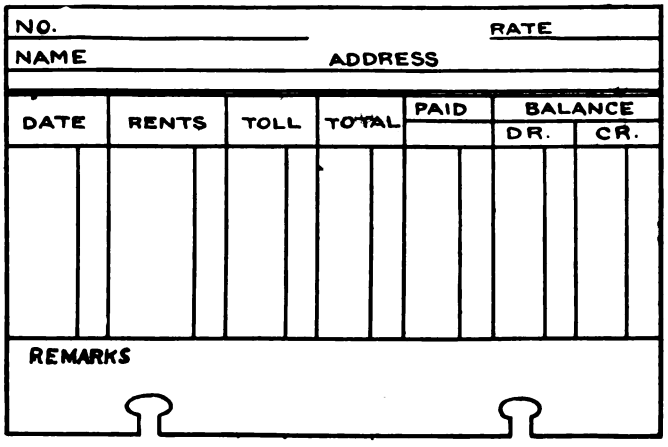

Fig. 9. Form of rental account, loose leaf system.

represents a fair average. This should not be confounded with maintenance. Maintenance is always easily determined, but not so with depreciation; the first is current, the second only determined at the end of the period. It is different from maintenance in that depreciation is always a liability, while maintenance is virtually an asset. The former is the victim of varying conditions, for example, damage due to storms, fires, etc.; deterioration, becoming obsolete on account of progress in the art and other reasons. The one is therefore a direct loss, while the other is only indirectly so. While the allowance of ten per cent. suggested for depreciation will be questioned by many the author's personal experience is that in the past no plant with which he has been connected has remained in service much, if ever, over ten years, and in some of the older plants, where the construction and material were poor, he has known the actual loss to be almost twenty-five per cent. One should be willing to face the facts as they present themselves. The higher the maintenance efficiency is maintained the lower will be the loss on account of depreciation under ordinary conditions.

The recent introduction of the loose-leaf system of bookkeeping makes this article incomplete without a brief review of the same. It is essentially a development of recent date, and as yet has not been introduced to a great extent in the telephone business. The old method of pinning or gumming sheets together for extensions is thus at one stroke dispensed with. By

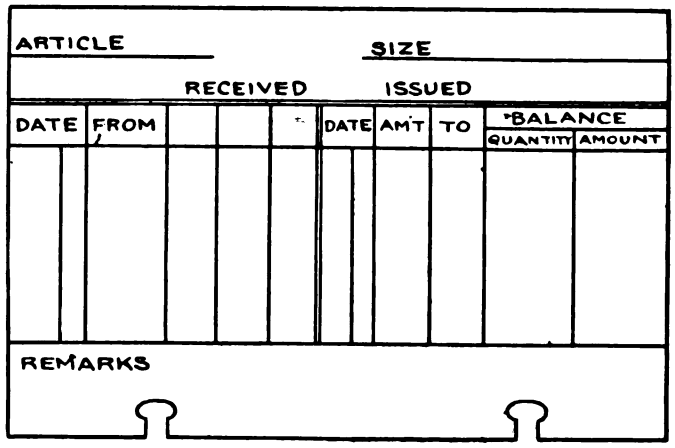

Fig. 10. Supply record for loose leaf system of filing.

this means each leaf is loose and at all times interchangeable and removable instead of being bound in a book. The leading features of this system are: Elasticity, saving in space and material, perpetuity if desired, saving of time and labor, facilitation of changes. In the telephone business this method saves a large amount of labor which is now wasted each year in transferring accounts from one ledger to another. In the larger exchanges this runs into the thousands. Again, when the telephone is for any reason given up or transferred to another party it is only necessary to enter on the register the transfer and change the loose leaf to the new location. It is then possible on this system to take care of almost if not every detail of the telephone business, and the forms shown in Figs. 8, 9, 10, 11 and 12 will give the reader some idea of the manner in which such a system can be arranged. It is true books cannot be very well entirely dispensed with, in fact such a condition is not absolutely necessary, but they can be very materially reduced both in size and number.

By the use of this method the necessity for periodically opening a new set of books is dispensed with. In Fig 8 is shown a form of rental, in Fig. 9 a form of individual rental account, in Fig. 10 a form of supply card, and in Fig 11 a form of toll card. Fig. 12 is the ledger sheet. On the Pacific coast, because of the small number of what are termed "Permanents," that is, those who keep renting from year to year, the loose-leaf system has gained ground very slowly, but is certainly captivating those who have

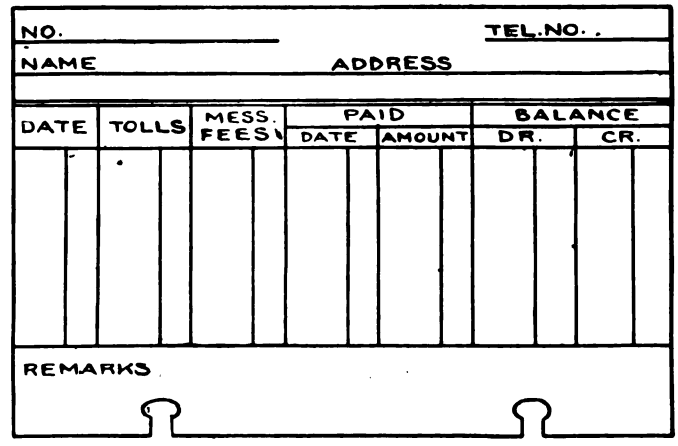

Fig. 11. Loose leaf toll record form.

tried it. It is only a question of a short time before it comes into general use. By this method it is possible to know at a glance the status of any account, and for this reason alone it should recommend itself at once to the officials. It is also possi-

*Continued from the issue of June 9th.

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ble to keep the pay rolls of the several departments by this method. If books are used and carried from one bookkeeper to another then it is possible for the last one to know all that has transpired during the term of his predecessor. Sometimes this is undesirable and can be easily eliminated by the use of the loose-leaf method without buying a new book. It is possible in the card system to use both sides of the card and it is often good economy to do so, but few seem to avail themselves of this possi-

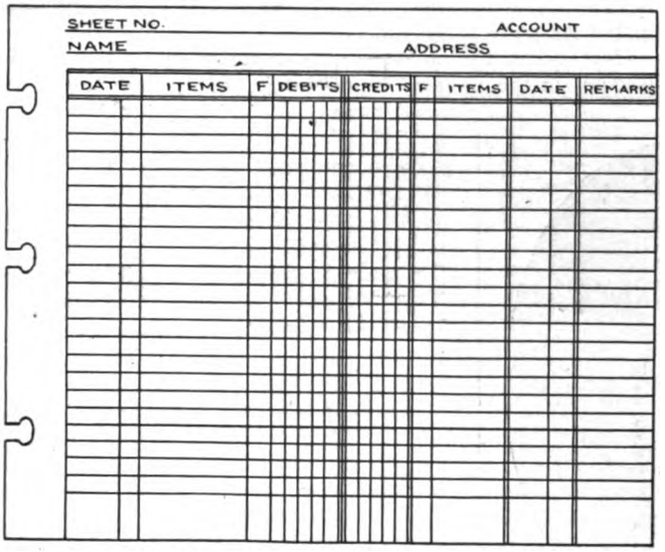

Fig. 12. Form for ledger sheet to be used in loose leaf system.

bility. The forms shown have been simplified as much as possible and can be elaborated upon as to the detail to be obtained by the individual, to an almost unlimited extent.

THE LOCATION OF LINE AND CABLE FAULTS.

By J. Adler.

(Continued from the issue of June 9.)

NOW a few words as to Blavier's test. Sometimes a case may arise where it is impossible to get a good wire. Here is where Blavier's test would prove of value, providing there is no difference of ground potential between the testing point and the fault or the distant end. To make this test connect the bad wire to the post L and ground L_1. With the battery grounded make a measurement. Call this R, which will equal the resistance of X plus the resistance of F, the fault. Ground D, the bad wire, at the far end and measure resistance again. Call this R_1, which equals the resistance of X plus the resistance of F and Y in multiple. From R and R_1 and L (the resistance of D which can be closely approximated if the gauge and length are known), Formula 7 is derived, as follows:

Formula 7.

$$\frac{A}{B} = \frac{X+F}{R}$$

$$A = B$$

$$X + Y = L$$

$$Y = L - X$$

$$\therefore R = X + F \qquad F = R - X \qquad (1)$$

$$R_1 = X + \frac{F\,Y}{F+Y}$$

$$R_1 = X + \frac{(R-X)\,(L-X)}{R-X+L-X}$$

$$\frac{R\,X + L\,X - 2\,X^2 + R\,L - L\,X - R\,X + X^2}{R+L-2\,X} = R_1 \therefore$$

$$R_1 = \frac{R\,L - X^2}{R+L-2\,X} = R_1\,R + R_1\,L - 2\,R_1\,X = R\,L - X^2 =$$

$$X^2 - 2\,R_1\,X = R\,L - R_1\,L - R_1\,R$$

Add R^2_1 to both sides of the equation and extract the square root.

$$X - R_1 = \pm\sqrt{R\,L - R_1\,L - R_1\,R + R_1^2}$$

X must be less than L $\therefore$ Root is negative.

$$X = \sqrt{(R_1 - R)\,(R_1 - L) + R_1}$$

Subtract the first reading from the second, then subtract L from the second reading, multiply these two differences and extract the square root of the product; add this result to the second reading, which will give the resistance of X to fault F.

This test is of value where a pair has a high resistance shunt. If the shunt were solid, of course it would be a simple matter to take a direct resistance measurement, and calculate the length in feet per ohm; but whether the shunt has resistance or not cannot be determined, so when other tests cannot be made this is convenient. The test is made with the battery in normal position, and with the far end of the pair shunted solid for the second reading. In this case Formula 4 gives the loop resistance to the fault, and not the resistance of a single wire. Also Z is the loop resistance from the instrument to the point P. To get the distance to the fault, take one-half X and multiply by feet per ohm. This test is ineffective if the shunt varies considerably, or, in the grounded wire case, if there is a difference of ground potential. With a varying shunt, the resistance might change between the first and second readings, and thus cause serious error in the result; and where difference of ground potential exists a continuous deflection of the galvanometer will occur when the galvanometer circuit is closed. Of course, in the latter case this deflection could be neutralized by inserting an adjustable opposing E. M. F. between Z and the bad wire, but this would make the test too involved for ordinary work.

In the Murray and Varley tests the resistance of the fault or any variation thereof does not affect the result, a high resistance fault requiring only an increase of the E. M. F. of the testing battery. If a galvanometer is not obtainable for these tests, or is not sensitive enough, a telephone receiver can replace it, and either direct or alternating E. M. F. be used.

In working on a short length of cable where the resistance may be only two or three ohms, the Varley test with an even bridge is not satisfactory, close enough readings not being possible. In this case use the Murray, or if the Varley is desired, an uneven bridge can be used and the formula changed to meet the new condition. Supposing the A arm is 10 ohms and the B arm 100 ohms (if the test set has a commutator be sure the high arm is connected directly to the rheostat), then part (3) of Formula 1 is changed to the following:

Formula 8:

$$A\,X + B\,X = B\,L - A\,R$$

$$A\,X + 10\,A\,X = 10\,A\,L - A\,R$$

$$11\,A\,X = A\,(10\,L - R)$$

$$X = \frac{A\,(10\,L - R)}{11\,A} = \frac{10\,L - R}{11}$$

When calculating length for open wire tests, all laterals where the pair under test taps, must be considered as so much additional length. In a test for cable trouble, if the cable is distributed under the multiple tap system, apparent locations must be watched closely to avoid error. In Fig. 4 suppose the wire M is tapped so that it appears at A, B, C, D and E. A location is made from M to

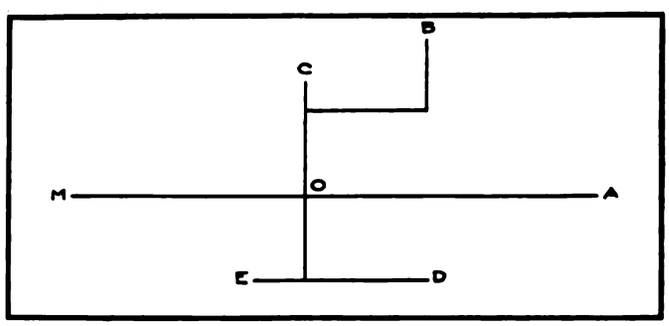

Fig. 4. Condition of lines existing under multiple tap system of distribution.

A. The trouble locates at O. It may be here, or it may be in

(Continued on page 396.)

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The Ideal Manager*

By Lon H. Hutchison.

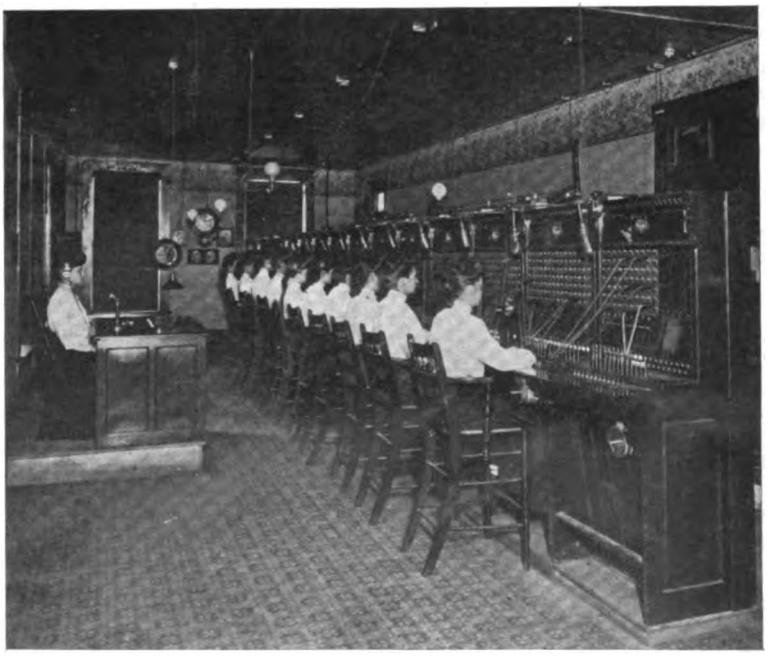
THE manager of a plant of say 1,000 subscribers, who should be a thoroughly practical man, is supposed to know how to install a station, and know when it is done properly, remedy an instrument trouble, locate and repair a trouble in his board, and in an emergency don a pair of climbers, climb a pole and be able to do something when he gets there. The ability to make an accurate measurement with the bridge, know how to open a cable, make a repair and wipe the joints when he has completed the work, are accomplishments, and renders such a man a valuable asset in the stock of a company. The costs of the various items that go to make up a plant, poles, wire, insulators, brackets, braces, arms, batteries, cords, hardware, instruments, etc., change frequently, and constant inspection of discount sheets is necessary if the manager would know where and how to buy. Eternal vigilance is the price of steady, economical growth, as well as of other things we have been advised of.

Lon H. Hutchison, Manager of the Huntington Mutual Telephone Company.

While at all times the head of the exchange, he should have able, willing assistants, and their hearty co-operation is essential to the proper operation and maintenance of the plant. Frequent and regular consultations should be held, and plans and suggestions looking toward the betterment of the service discussed. Friction between the employees should be disapproved, and petty jealousies, which frequently appear, should be promptly smothered. No partiality should be shown, but I have found that a word of commendation to an operator or other employee, who constantly endeavors to make him or herself agreeable to everybody, who considers the company's interests his own, is well expended. The annual vacation of at least a week on full pay brings to the company an increased revenue in good will, appreciation and a desire to please. The finest system in the world, most up-to-date board, amounts to nothing if the operating force is not in keeping. I place the greatest stress for the success of an exchange upon the operating force.

The manager should keep posted in his business through the technical press—and we have some ably conducted periodicals—be able to discriminate between a practical appliance and a catch-penny invention, and be ever ready to give to his company the benefit of any new device for the betterment of the service, or the reduction of expenses. I would not suggest the frequent changing of apparatus or the addition of new makes of instruments, lest he soon find his exchange filled with a heterogeneous collection of instruments which necessitates the expenditure of too great a sum in the way of duplicate parts. One, not more than two kinds of instruments at best, are all that should be used, and in this way a standardization of apparatus is possible—and this is a consummation devoutly to be wished.

Overloading the manager with duties so heavy that he will be kept in the position of a clerk is poor policy. He should have competent help, in a bookkeeper, collector, day and night chiefs, wire chief, inspector, and sufficient linemen to keep the construction work well in hand, as well as to keep the plant free from accumulated troubles. The chief operator who has charge of the operators, the wire chief who handles the board, inspectors and linemen, and the bookkeeper who looks after the collections must work in harmony with the manager, and be held responsible for the work in their several departments. A system carefully worked out and strictly adhered to, which embraces punctuality, civility, decorum and above all discipline, makes the operation of any sized plant what it should be.



The Operating Room of the Huntington (W. Va.) Mutual Telephone Company.

*Abstract from paper read before the convention of the Independent Telephone Association of West Virginia.

CAUSE OF SLOW TELEPHONE DEVELOPMENT IN EUROPE.

HERBERT LAWS WEBB has recently written for the London Times several articles on "Commercial Telephony," in which he gives a number of reasons why Europe has lagged behind America in establishing an adequate service.

The principal cause stated is the difference of the attitude of the public—and of the representatives of the public—of the two continents toward the telephone service. In America the telephone service has been treated as a friend, or as a promising youngster capable of effecting vast improvement in the conduct of affairs. No artificial restrictions have been imposed to hinder its development, and neither the telephone manager nor the public has put the question of cost before the question of efficiency.

In Europe the telephone service has never been treated as a legitimate business enterprise and has never had a fair field. From the very beginning it has been treated as a mere offshoot of the telegraph—which it is not—and it has occupied the position of Cinderella in the family of methods of communication placed under government control. As a result, not only have all sorts of harassing restrictions inseparable from a bureaucratic control been brought to bear, but telephony as a science, telephone engineering as a specialty, and telephone administration as a distinct branch of organized effort have been neglected. Even a consideration from the standpoint of investment should show the error of this attitude.

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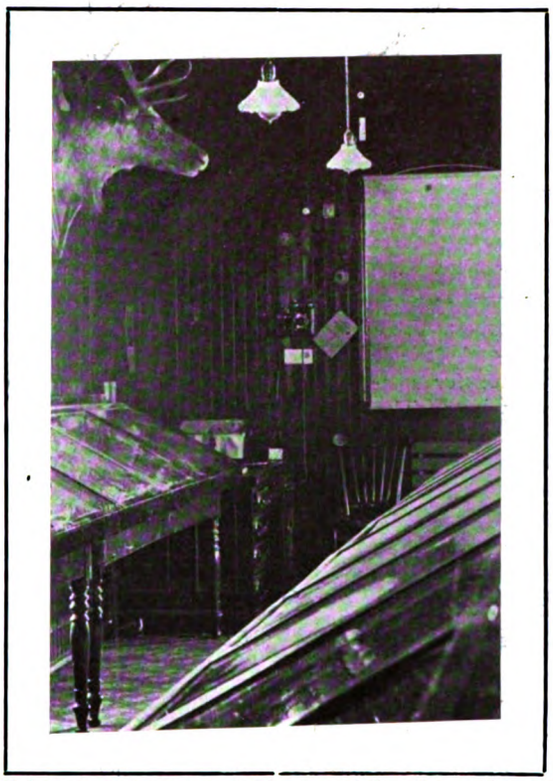
Independent Line Bridging Niagara Gorge

By C. H. Cutler.

AFTER making a fight for business which has brought over nearly every former subscriber for Bell service in Niagara Falls, N. Y., and added many people who have never used the telephone, General Manager R. M. Eaton, of the Niagara County Home Telephone Company, has bridged the Great Gorge with a line and is now giving a demonstration of first-class telephone service to the Canadians.

Niagara Falls is a city where enterprises productive of large results are so common that it takes something unusual to excite attention. Probably there is no place in the country where it is possible to find men who are more accustomed to the daily handling of important business interests. The great number of enterprises undertaken in connection with caring for the enormous numbers of tourists which are daily brought in by the several railroads, and the extraordinary development of electrical and manufacturing industries of various sorts, based upon the almost unlimited water power available, have caused to gather together a group of business men who are particularly alert in seeking all possible advantages.

Especially significant, therefore, is the remarkable success of the Home telephone company, which only a few months ago began to give to the city and surrounding towns first-class Independent telephone service. Starting with old equipment, and a service incapable of competing with even the poorest article which could be offered by an opponent, Mr. Eaton has built up a system which by its merit has won the unqualified approval of those men who must have the best. The most striking of all the extensions which have been begun and so rapidly completed is that which bridges the great gorge of Niagara. Canada is now, for the first time, able to talk with the United States over an Independent line. Provided with wires to the exchanges of both companies from his inclined railway just above the bridge on the American side Mr. Frank E. Lawrence was a frequent user of the telephone. He also operates a similar railway on the Canadian side just below the bridge, and the necessity of being in constant touch with his affairs wherever he might be made telephone connection between the two places very necessary. When it came to a choice the service of the Independent company so far excelled that there could be no question as to the proper instrument to have, and he gave the order that has caused the joining of the two countries. In his building on the Canadian side is now installed a metal case instrument of the most modern type. This is connected with the wires which span the gorge just a few feet below the suspension bridge; so that this telephone line, which is likely to be so significant from a historical point of view, possesses also one of the most remarkable scenic locations of any line in the world.

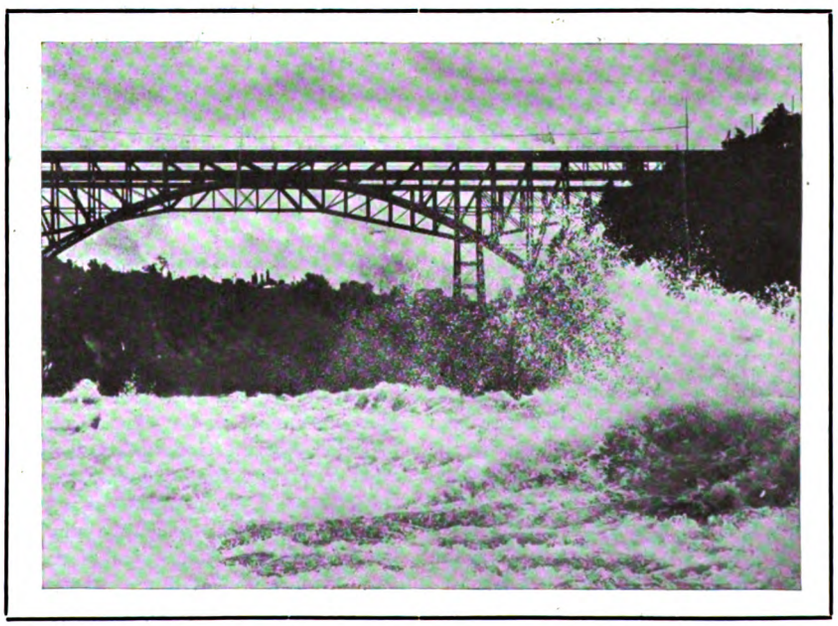


Telephone Instrument and Directory of the Niagara County Home Telephone Co. in the House at the Head of the Inclined Railway, Above the Whirlpool, in Canada.

From the instrument conversation may be held with all of the Independent subscribers in Niagara Falls and many other places connected by the excellent system of toll lines extending in various directions from the exchange. It is remarkable that although such immense quantities of electricity at varying voltages are distributed on the nearby lines of the power companies, conversations heard over this wire are as strong and clear as those in exchanges widely remote from any disturbing influence. The result of this is that to the many people on the Canadian side, accustomed to use the old Blake instruments, the little telephone in the curio store at the head of the railway is an object lesson which cannot fail to reach its mark.

Just at the present time agitation against monopoly in telephone service is proceeding in many portions of Canada. It is likely that in the future the development of the service by interests independent of those at present in control will be widely undertaken. In the light of these facts the single pair of wires takes a place as the forerunner of a most important influence in the progress of Canada, for it is already being realized that the great business interests of the dominion demand the best facilities for communication. The people generally are looking into matters and are eager for information. The opportunity to test the service offered by an Independent company secured through the conspicuous location of this instrument in a place visited by thousands each year is likely to be utilized by many alert Canadians.

The actual start has been made, the excellence of the service is established, and the extension of the Independent telephone movement into Canada seems to be assured.



The Gorge of Niagara, Spanned by the Independent Telephone Lines, which are carried across just below the Suspension Bridge.

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IN THE OPERATING FIELD

ILLINOIS COMPANY MAKES WIDE EXTENSIONS DURING PAST YEAR.

RAPID extension of plant during the past year was reported at the annual meeting of the Macomb & Western Illinois Telephone Company recently held at Macomb. The reports of the various officers showed the company to be in a satisfactory condition. No dividend was declared, but the earnings were very satisfactory to the shareholders, five-sixths of whom were present or represented. The opinion was unanimously held that the policies which have prevailed for the past year should be continued under the same management and the following officers and directors, all of Macomb, were elected: president, C. M. Erwin; vice-president, George Kerman; secretary, E. Y. McLean; treasurer, C. V. Chandler; directors, C. M. Erwin, George Kerman, W. I. Savidge, L. E. Guy and Belle Erwin.

As in the past the company will continue for some time to reinvest its profits in extensions and betterments. There is said to be a ready sale of the company's bonds, and the new investments from bond sales and reinvested profits amount to about $2,000 a month.

In the past twelve months the company has constructed 250 miles of pole lines and strung more than 3,000 miles of wire. It has acquired two new exchanges, at Camp Point and Golden, and has extended its long distance service into a considerable territory north and west of Macomb, including many points in Illinois and Iowa.

Within 60 days a metallic long distance line will be built from Macomb to Quincy, where it will connect with the Home Telephone Company. Through that connection the company will be able to reach St. Louis over Independent lines which will give connections all over Missouri and Kansas. It will have connections through the Kinloch Company of St. Louis and reach all of Southern Illinois, including Springfield, as well as Southern Indiana and Northern Kentucky. Another long distance all metallic extension to be made this season is to Keokuk, Ia., by way of Bowen.

The company now owns and operates exchanges at Macomb, Colchester, Rushville, Plymouth, Augusta, Golden, Camp Point, Carthage, Warsaw, Bowen, Loraine, Stillwell, and Quincy.

BELL LOSING MANY FARM CONNECTIONS IN ILLINOIS COUNTY.

EFFORTS on the part of the Central Union Company to regain its lost ground in Illinois seem to be meeting with poor success. Independent development has been so persistent that many of the residents in the country districts have given up the Bell system entirely as the service furnished was inadequate. In Henderson county the local companies have been extraordinarily progressive. Almost every farm house in the county now has Independent service and the residents use the toll lines of this system exclusively.

REPRESENTATIVES OF WISCONSIN INDEPENDENT COMPANIES MEET AT MONROE.

AT the meeting of representative Independent telephone men recently held in Monroe, Wis., representatives of the Brodhead, Jefferson, Browntown, LaFayette County, East Winslow, Juda and Badger State companies were present. They had a long and interesting meeting and formed a county association. The following officers were elected: George Barnum, Juda, president; Leland White, Monroe, secretary. Considerable discussion was held on the condition in Monroe, where there is at present no Independent company. It is believed that many of the people are anxious to see a new company established in order that they may connect with the people in other towns which have connections only with Independent lines.

NORTH DAKOTA INDEPENDENT TELEPHONE MEN UNITE IN FORMAL ORGANIZATION.

REPRESENTATIVES of about twenty Independent telephone companies of North Dakota have organized the North Dakota Telephone Association and adopted a constitution and by-laws. Officers were elected as follows:

President, A. B. Cox, Valley City; secretary and treasurer, John Carmody, Hillsboro.

The object of the association will be to promote co-operation on the part of the various companies.

At the morning session of the meeting the members of the association listened to an address by J. Q. Zietlow, president of the Dakota Central Telephone Company, on "Methods and Right of Way." At the afternoon session there was a general discussion of such subjects as arbitration, right of way, toll line connections, exchange and rural rates, development of the telephone system and cost of construction and material.

Those who attended the meeting were: W. C. McDowell, of the Union County Telephone Company; W. V. Hughes, Hughes Electric Company, Bismarck; Ed. Hughes, Hughes & Dieter Company, Dickinson; T. C. Lane, Kensal Telephone Company, Courtenay; C. H. Tolan, W. F. Hegge and S. H. Hagen, Red River Valley Telephone Company; E. Q. Powilson, Wheatland Telephone Company; A. B. Kerlin, Devils Lake Improvement Company; W. T. Baillie, Hunter Telephone Company; John Carmody and A. T. Krabel, Traill Telephone Company; A. B. Cox, Valley City Telephone Company; C. E. V. Draper, representing the Missouri Valley, Mandan and Southern and Mandan & Northwestern Telephone companies; G. More, Buffalo Telephone Company; E. D. Baker, Forman Rural Telephone Company; M. M. Borman, Abercrombie Telephone Company; E. M. Shannon, Sanborn Telephone Company.

RECONSTRUCTION OF PLANT OF BELVIDERE TELEPHONE COMPANY TO BE COMMENCED.

REQUIREMENTS due to the enlargement of its subscribers' list have caused the directors of the Belvidere Telephone Company, of Belvidere, Ill., to decide upon a complete rebuilding of the company's plant. New lines will be put up, cable installed and a modern multiple switchboard provided in the central office. It is estimated that not less than $25,000 will be expended upon these important improvements.

GREEKS WANT AMERICANS TO BUILD TELEPHONE SYSTEM.

CONSUL GEORGE HORTON, of Athens, advises that there is a growing discontent in Greece over existing telephone conditions. He writes:

"The appliances in use are inadequate and the service unsatisfactory. For this reason the telephones are but poorly patronized, and I am informed on good authority that they are an unprofitable investment to the Government, which controls them. It is probable that the Government would grant a concession to some reliable private company that would install up-to-date, effective telephones. I am confident that this bright, progressive people is ready for such a telephone service, and would support it with their patronage. The value of the present plant is about $125,000. The French Adder system is in use, with German keyboards. There are at present only about 600 telephones in operation at Athens, Piræus, Phaleron, Kephissia, Decelia, and one long-distance wire connecting Athens and Patras.

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The present charges are 100 drachmas (drachma = 19.3 cents) a year for a local telephone, 250 drachmas where connection is made between cities, and 1 drachma for five minutes' talk between Patras and Athens. Salaries paid to operators range from 120 to 400 drachmas per month. Here possibly may be a profitable opening for American capital, as there seems to be a very general desire on the part of the people, which I have heard frequently expressed, that "the Americans would come and take hold of the telephones." For the granting of this and all similar concessions a vote of parliament is needed, sometimes easily obtained, and in other cases only after many and elusive promises and long and exasperating delays."

BELL IMPROVEMENTS NOT SATISFACTORY TO PEOPLE ON PACIFIC COAST.

TO retain its monopoly the Bell Telephone Company made to the citizens of Eugene, Ore., many promises of improvement in its service. Willing to give the company the chance to redeem its past failures, the business men of the town last December signed a remonstrance against the granting of a franchise to an Independent company. Now they are sorry.

The new plant has been installed, but the service is said to be still far behind that given by the Independents in other parts of the State. Dissatisfaction is being freely expressed and the same business men who generously assisted the Bell company a few months ago have now organized to protest against the inefficiency of the system provided.

In Ashland the company has caused considerable indignation in the minds of many prominent citizens who say that it has asked for exclusive franchise privileges at the same time that it is discriminating against local subscribers in its rates. In Medford the service is frequently condemned by people who, through visits to other places, have become familiar with what can be done with a well equipped telephone system. It is generally understood that the inadequacy of the present system will result in the early introduction of Independent service in all the important towns along the coast.

ANOTHER BLOTTER SUGGESTION FROM ILLINOIS.

DESIGNED for a comparatively new and rapidly growing company, the following verse for a desk blotter offers an interesting suggestion. It was contributed by L. A. Herrick, manager of the Stephenson County Telephone Company, of Freeport, Ill., who has devoted considerable attention to this form of advertising. "Look for the Shield" is the motto which is almost invariably recommended for the left hand side of desk blotters by many designers of this successful form of advertising; Mr. Herrick seems to find it desirable, however, to occasionally make an exception to the rule, and substitute the phrase "Best in the Field," descriptive of his own service. Upon the right hand side appears the following jingle:

Save your dollars and pay us your dimes
for "Hurry up" trips—use the new lines.
Not only in Freeport but in towns all around,
Our "Toll" lines will reach him if your man can be found.

INCREASING RATE OF GROWTH OF INDEPENDENT SYSTEM IN GRAND RAPIDS.

AT the last monthly meeting of the directors of the Citizens Telephone Company, the exceedingly rapid growth of the Grand Rapids (Michigan) exchange was a subject for consideration. The net increase in orders since January 1 has been almost six hundred telephones, the increase for May alone being 122 telephones, and the number in service on the first of June, 7,718, with more than one hundred orders to fill.

Because of this remarkable growth, which has been more especially in the southeastern portion of the city, the board formally authorized an expenditure of $21,000 for increasing the underground system and for cable in that part of the city.

This provision is expected to care for about five hundred more telephones in that district as to cables, and will provide underground ducts for approximately 2,500 more. Throughout the city the growth has been exceptionally rapid, more so, it is said, than at any previous time in the history of the company.

TOPEKA INDEPENDENT COMPANY RUSHING WORK ON IMPROVEMENTS.

IN Kansas they do things rapidly. Only a very short time ago the Independent Telephone Company of Topeka announced its intention of putting in an extensive underground system, and already large quantities of supplies are on hand and more are being shipped. The company intends to take down all poles in the business section of the city and lay conduits for present and future requirements of its rapidly growing system. This information is especially pleasing to the citizens of Topeka at the present time, as work on improvements in the city's appearance is being actively undertaken by some of the leading citizens, and the co-operation of the Independent Telephone Company is much appreciated. Within a few days work will be started on the new office building which is to be erected by the company.

TWO THOUSAND TELEPHONES IN A PHILADELPHIA STORE.

PEOPLE who are watching the introduction of the telephone into department stores are wondering when the limit will be reached. Just now the record is held in Philadelphia, where Wanamaker's big store recently completed the installation of a branch exchange which has connected to it 2,000 instruments. For handling the business a twelve position switchboard is used, and telephones are installed at each counter. They are provided with automatic coin boxes, to insure payment for all outward messages, and may be used by customers if desired. This is a distinct step beyond the use of the instruments only for the business of the store. One hundred and twenty trunk lines are in use to connect the branch exchange with the regular telephone system of the city.

INDEPENDENT COMPANY AT NEWARK, ILL., WIDELY EXTENDING ITS CONNECTIONS.

AT a meeting of the Farmers & Merchants Telephone Company recently held at Newark, Ill., it was voted to increase the capital stock by $15,000 in order to make needed improvements and extensions. The company intends to increase the territory covered by rural lines connected to its exchanges, and also to build into the towns of Marseilles and Seneca. This company at the present time has connections with the Interstate of Aurora, the Northern Illinois of Sandwich, and the Ottawa Home Telephone Company of Ottawa. When all the lines are completed the area over which free service is obtained by Independent subscribers will include the whole eastern and northern end of the county. Extremely good service is being given by these Independent companies, and in consequence their strength is increasing rapidly.

THE LOCATION OF LINE AND CABLE FAULTS.

(*Continued from page 392.*)

either of the laterals or sub-laterals. Send to B and locate from there; if it locates at O again, send to E or D; if it comes again at O it is safe to say it is there, but usually the trouble will be found to be in one of the laterals. Here, it would be well to note that it is of the greatest importance that all connections between the wire under test and the bridge, and also the loop or shunts at the far end, should be of the best. A resistance of two or three ohms introduced through a poor connection, will cause an error, possibly of several hundred feet, in the location. In making any of these tests all unnecessary resistance should be eliminated, such as jumper wires, switchboard cable, etc. If possible tests should be made directly from the cable heads, if underground cable, or from the loop pole, if aerial. Experience and familiarity with the different tests will enable one to judge a condition of trouble, and use the standard test or variation thereof which is most suitable for the particular case.

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THE EDITOR'S PAGE

FEATURES OF THE CONVENTION.

REPORTS from many states indicate that the convention of the National-Interstate Telephone Association, to be held during the coming week, will be attended by a very large number of delegates and visitors. A good program has been arranged, much important work will be undertaken, and the gathering is sure to bring both pleasure and profit to every Independent telephone man who goes to Chicago.

So rapid has been the growth of business that many new men will during the coming week attend their first convention. To these especially will the meeting be useful. It will give an opportunity to learn more of the personality and methods of the men who have done so much for the building up of the larger and more successful systems, and will give an impetus to progress in a great number of new localities.

The manufacturers of apparatus have arranged for most valuable displays, which will be extremely interesting and important features of the meeting. In no branch has the art made such progress as in its manufacturing side, so that the products exhibited here will in general represent the highest grade of material which can be turned out by the engineers and shops of the country. There will be opportunities to inspect new devices, and improvements on the old standards, which will in themselves make the information gained by a visit to the convention furnish a means of effecting economies which will many times over pay the expenses of the trip. Not only will the manufacturers have exhibits of their factory products, but their representatives who will be in attendance include some of the best informed men in the telephone business. Many a puzzling problem has been satisfactorily settled after a brief discussion with one of these engineers, and as their knowledge of practical conditions is wide, their presence will be appreciated by many operating men.

The social features will form a very important part of the meeting, and should not be neglected. Every man, no matter how big or how small a plant he represents, will come prepared to get acquainted with others who are carrying on the work in many states, and help promote the most cordial feeling which is so pleasant a feature of the meetings of Independent telephone men.

Although several good papers will be read the discussion of the subjects of general interest should bring out the ideas based upon the widest possible experience. Not only do methods vary according to locality and service conditions, but in a business which is rapidly increasing there come up many new things which deserve to be told.

The Association has been advancing rapidly as a factor of great and genuine importance as the Independent telephone systems have grown in size and strength. The extension of its influence throughout the entire country is a most valuable aid to the establishment of Independent companies upon a permanent foundation. All questions of policy which arise must be treated in the light of the national responsibility which rests upon the members, in order to secure the highest success for each part of a system which will soon cover the entire country.

TENDENCIES OF EXPANSION.

SOME time ago telephone companies devoted their efforts only to interesting people unfamiliar with the advantages of telephone service. It was a matter of public education. Nowadays, however, the business has got beyond this stage, and the up-to-date manager not only tries to bring new people to the point of connecting their residences or places of business with his exchange, but to extend the system amongst old subscribers.

The essential function of the telephone is to save the time and effort of its user, and its existence depends upon the fact that it enables two people to transact affairs in the same manner as if they were face to face, without spending time traveling over the distance by which they are separated. To carry the matter still further, it is acknowledged that while a person's time may not be equally productive at all hours, it is as valuable at one part of the day as another, and the time lost in going to the telephone is just as much wasted as when it is unprofitably employed in covering the distance to any other point. The telephone, therefore, to be most useful to any person, should be installed wherever he spends a considerable portion of his day, if his time is sufficiently valuable to make the total amount saved in the day equal in value to the average cost of the extension telephone, which is, of course, a very small figure. The extension set, whether attached to a direct line or a branch exchange, offers a means of cutting the lost time to a minimum, and its installation is being widely encouraged and is meeting with the most favorable reception by the public. The thousands of installations which are being made in residences and places of business show clearly the way in which subscribers are coming to realize that the close proximity of a telephone is essential to comfortable and efficient living. People, however, wake up slowly to this knowledge unless assisted. Constant reiterations and illustrations of the fact in ways which will keep the matter continually before the public are necessary in order to develop fully the line of increase which has come to occupy so important a position in the plans for extension.

It is in this way only that the highest development of any territory may be secured, for growth must not be limited by the number of people in the district. This idea is the basis for the introduction of an element which will soon become a very important part of the average telephone plant, judged by its comparative revenue producing powers.

INERTIA IN THE TOLL BUSINESS.

IN his admirable paper on "Standardization of Methods and Appliances," presented before the Western Society of Engineers, and recently printed in this journal, Mr. F. R. McBerty dwelt upon the difficulty of introducing improvements in telephone service, arising from the inability of various persons to appreciate the value of the change. He emphasized the fact that new things are not used on account of any real lack of merit which exists. The failure to take up with the novelty is not for the reason that it is not best to use it, but simply because people are accustomed to something else.

The Independent manager who has built toll lines, and provided an efficient force for maintaining and operating them, and then failed to get sufficient business to make them pay, is aware how strongly this applies to his subscribers. The subscriber looking for toll connections is in the habit of using the instrument which he has always used for business of this class, and it is only by constant efforts that he can be made to break away from this custom. There are, however, ways to convince him that it is to his interest to use the newly established lines. Some managers are much in favor of personal interviews with their subscribers, in which they make practical demonstrations of the efficiency of the service which they can give. Still others believe in steady advertising, and endeavoring to keep the fact they can give toll service to certain definitely mentioned points constantly before the public in this way. The subject is so important, and deserves such general consideration that THE AMERICAN TELEPHONE JOURNAL will be glad to learn more of the methods which have been employed in various places and have resulted in substantial increases in the use of toll lines.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HOUSE MOVERS CANNOT INTERFERE WITH TELEPHONE WIRES.

Will you kindly answer the following in your next issue: Where our wires and guys on the public highway are suspended sufficiently high to not interfere with the ordinary use of the highway, are we compelled to remove them free of cost when a house is moved along the street? We have been much bothered in this way, our movers claiming that we are required to get our wires out of the way in such cases, and this matter is becoming almost a burden with us. Please tell me if there have been any decisions in Indiana bearing on this matter, also any decisions in other states that would help us to shape our course in the future.

C. R. S.

THE editor knows of no decisions in Indiana bearing on this matter, but the general principles of the subject have been well established by decisions in other States which are quoted below. Under the circumstances you relate, you do not need to remove your wires free of cost when a house is moved along a public highway crossed by your line. If the house mover can use a side street or an alley as well as the highway which is crossed by your wires, he can be compelled to take that course. The party moving the building can be required to pay all the expenses of removing and replacing wires and cables and can be compelled to guarantee payment beforehand. A bond to pay all expenses and hold the company harmless might be required. The basis of this rule of law is that house moving is an unreasonable use of the streets. Northwestern Telephone Exchange Co. v. Anderson, 98 N. W. 706. Nagle v. Hake, 101 N. W. 409.

GOOD PIKE POLES MUST BE FURNISHED.

A CORPORATION maintaining poles to support electric wires must perform its duty by furnishing pike poles for handling such poles, of the ordinary kind and in good condition, and is not liable for an injury to an employee caused by the use of a pole upon which the point has become blunted or dull, so that it can no longer be relied upon as a brace for poles which are being taken down. Town v. Elec. G. & P. Co. (Cal), 70 L. R. A. 214.

COUNCIL CANNOT DECLARE ONE COMPANY'S RATE TOO HIGH.

JUDGE RAMSAY, at Davenport, Ia., has filed his opinion stating in detail his reasons for granting the injunction asked for by the Central Union Telephone Company to restrain the city from destroying its property.

The court says that the first question is as to whether or not the law governing telegraph companies has application in reference to telephone companies. He holds that the telegraph act as construed by the supreme court authorized the city at the time of the passage of the ordinance in 1887 to license the Central Union Company and allow it thereby to erect poles and string wires in the city.

He then dwells on licenses and contracts and holds that by reason of the company's acceptance of the ordinance, its expenditures for erecting poles, stringing wires and making other permanent improvements, the license becomes a contract.

He dwells at some length on special and general privileges and holds that the privileges granted the company are general and not special. He holds specifically that the council should not constitute itself an arbitrary judge in the case. It cannot abrogate a contract by simply stating that it is wrong. It is a matter for judicial consideration.

He decides that the council has no right to declare that the rate of one company is too high and proceed against it personally. Its course should be to establish a rate to apply to all companies doing business in the city and then proceed against any one acting contrary to the ordinance.

DOES INABILITY TO GET FRANCHISE EXCUSE COMPANY FROM INSTALLING TELEPHONES.

Several Jersey City people who signed contracts for the installing of telephone service in their homes, threaten to bring suit against the New York and New Jersey Telephone Company unless the latter at once carries out the agreement made with them. The company, coincident with the formation of the new concern, which has an application for a franchise pending before the Street and Water Board, engaged a force of canvassers to obtain the signatures of new subscribers. When a sufficient number had been secured, the canvassers were dismissed. Since then the company has refused to install the new telephones because of the difficulty of obtaining property owners' consent to the placing of poles on certain streets and the refusal of the Street and Water Board to permit the telephone companies to string wires on the poles of the United Electric Company and vice versa. Can the subscribers compel the company to furnish the telephones under the circumstances? W. L. T.

THE subscribers cannot compel the company to furnish the telephones because the property owners cannot be compelled to give their consent to the erection of poles in front of their property. This does not interfere with the right of the subscribers to sue the telephone company for damages for their failure to furnish the desired instruments. If the company made contracts it cannot perform, that is its own lookout, and it must pay for its failure.

If the company's line extends through the municipality and is not merely a local system of lines within the city, the company is authorized under its charter from the state to conduct a telephone business without regard to permission from local authorities, nor does it need a designation of streets by the common council. This, however, would not relieve it from the necessity of obtaining permision of property owners to construct its line in front of their property. New Home Telephone Co. v. New Brunswick, 40 Atl. 628.

CONSPIRACY CHARGED IN INSOLVENCY PROCEEDINGS.

A RECEIVER has been appointed for the Telephone, Telegraph and Cable Company of America at the suit of George F. Tennant of Jersey City, N. J., acting for the holders of 10,841 shares of stock in the company. A temporary receiver had already been appointed and as a result of Mr. Tennant's action, a co-receiver was also named. The petitioner admitted the insolvency of the company, but alleged that the proceedings were brought in the interest of the Bell telephone combination, and that the temporary receiver was appointed in its interest. It was also alleged that in order to secure the recommendations of the board of directors of the holding company, an offer of C. W. Morse, vice-president of the New Amsterdam Bank, to buy all the stock, was accepted. It was also stated that Morse represented himself to be in sympathy with the Independent telephone interests and that he would not sell out the holding company to the Bell system. This representation is alleged to be false and Morse to be acting solely as agent of the American Telephone and Telegraph Company. It is charged that at annual meetings through alleged dummy directors, he always voted down motions to take legal steps to compel defaulting stockholders to pay the balances due on their respective subscriptions.

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QUERIES

THE USE OF A HOLDING COIL.—(709.)

Will you please explain to me the use of a holding coil and give me an example of a circuit in which it is employed? N. L. H.

A holding coil is usually understood to be a coil used in connection with a special line to enable a person to control the supervisory signal at a common battery switchboard in such a way as to prevent a disconnect signal being received by the operator when the person using the line temporarily disconnects his telephone. The method of operating when such a coil is provided may be readily understood by reference to Fig. 709. In this is shown a standard Bell trunk to a chief operator's desk from the switchboard. When calling the desk the operator at the switchboard rings on the line, throwing down the armature of a relay made after approximately the same pattern as the old style self-restoring drop. This puts a ground on the lamp and lights it. By throwing the key which cuts her telephone set across the line, the chief operator pulls up the armature of the relay and extinguishes the light.

Quite frequently the call is of such a nature that she must refer to records, or she may wish temporarily to disconnect and cut in on another line. If such an occasion arises, she simply throws the key which cuts the holding coil across the line, and throws the listening key to the normal position, thus disconnecting her talking set. The retardation coil bridged across the line holds up the supervisory relay at the switchboard and prevents the illumination of the disconnect signal. In this way the operator is prevented from cutting off communication until such action is desired by the chief operator. Although a resistance may be used, it is customary to use a retardation coil, to prevent any shunting effect if the subscriber speaks to the switchboard operator.

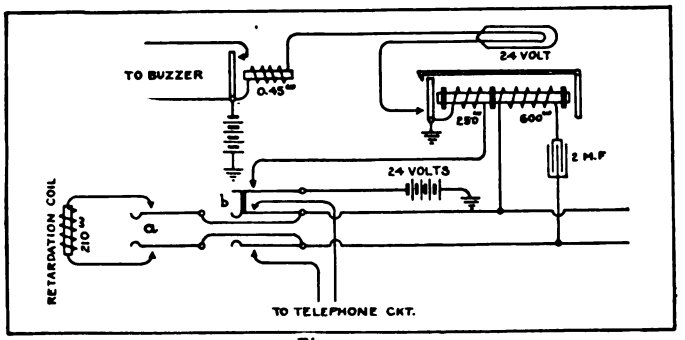

Fig. 709.

LIGHTNING ARRESTERS ON PRIVATE LINES.—(710.)

We have lines which come into our exchange for the purpose of connecting between cables through the main frame. They are private lines between two subscribers and do not connect with switchboard apparatus of any sort whatever. Should we connect these lines together through lightning arresters or simply bridge the gap by a straight jumper wire? R. N.

The proper arrangement depends entirely upon whether the lines outside are exposed to high potential currents or lightning. It is probable that in the average city district, where underground distribution is employed, there may be cases where not only the wires in question, but no other wires in the cable in which they are included, are exposed to high potential currents. In this event it would be sufficient to simply cross-connect them at the frame; otherwise suitable protection should be inserted. If, as in the usual condition in cities, they are exposed to heavy currents, such as electric light wires, the provision of heat coils will be sufficient, and wooden dummy carbons may be used in the arresters. If open wires are connected to any of the lines in the cable through which pass the wires in question they should be protected from the danger of lightning discharge by carbon plate arresters.

The fact that the private lines themselves may not contain any open wire is not in this event a sufficient safeguard to enable the use of carbon arresters to be dispensed with, as a burn-out in the cable may communicate a dangerous current from another pair of wires to those which form the private line circuit.

CROSS RINGING ON PARTY LINES.—(711.)

Our telephone is connected to a party line and our ring number is given in the directory as 11, but our bell is only supposed to ring once to call us. Very often we hear the bell ring and go to the telephone and find that we are not wanted, but the operator says she is calling No. 1; although we are not supposed to hear No. 1's ring, and sometimes do not hear it, whenever this happens No. 1 usually answers, that is, both bells are rung at once. Please explain whether we are getting the kind of service we are paying for, or if there is some trouble on the line which could be corrected? R. C. B.

The trouble you speak of occasionally occurs on party lines of a certain type. This is due to the fact the bell for No. 1 is connected between one side of the line and the ground, and the bell for No. 11 is connected between the other side of the line and the ground. When the operator rings she connects current to the side of the line which carries the bell of the subscriber desired, and as one side of her generator is grounded the desired signal is given; if, however, by any means the two sides of the line become connected together the current will pass across the connecting medium, whatever it may be, to the opposite side of the line from the one to which the desired subscriber is connected and the corresponding bell connected to that side of the line will respond. The difficulty you mention is usually the result of the subscriber having No. 1 being a little slow in answering, so that he happens to take his telephone off the hook at just the time that the operator is giving her second or third ring. The current passes through his transmitter to your side of the line and thence to the ground through your instrument. As the occurrence of such a condition is only occasional, the other advantages of the system over the code ringing party line are considered to be sufficient to offset the slight annoyance caused by the bells ringing unexpectedly.

TEAM WORK IN OPERATING.—(712.)

Is it considered good practice for an operator to answer calls which occur at an adjacent position?

The object in all cases is to avoid delay in the answering of calls, and one of the best methods of doing this is to have operators assist one another. The building up of efficient team work, whereby when one position is extremely busy the prevention of an accumulation of calls may be secured by the assistance of the operators at adjacent positions is one of the most important duties of the supervisor. By a proper study of methods for accomplishing this result the efficiency of the operating force at an exchange in which there is a large number of calls at a position during the rush hours may be very much increased.

CROSS TALK ON GROUNDED LINES.—(713.)

We have two grounded party lines running in entirely different directions. When parties are talking on both lines there is more cross talk than between other lines which run parallel. When an operator plugs in the cross talk disappears. Can you advise us? A. J.

Your difficulty is probably due to a cross between the winding of the drop on each line and the mounting plate. A buzzer or telephone and battery test between the line stud on the drop and its mounting plate would show whether this is correct. If so remove the drop, take out the core, and look carefully for a loose coil of wire, or place where the insulation has been worn off. By making careful repairs of any such trouble, giving a chance for the wire to become crossed with the shell, you will probably remove the cause of the cross talk. The present condition is really a direct metallic connection between the lines.

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TELEPHONE PATENTS

TELEPHONE SYSTEM.

Howard M. Post, Chicago, Ill., patents (No. 816,819; dated April 3, 1906; filed Oct. 24, 1902; serial No. 128,528) and assigns to the Kellogg Switchboard and Supply Company, of Chicago, Ill., a two division telephone system.

This patent has for its object the simplification of the exchange apparatus generally employed in the operation of a divided multiple board. A board of this type is divided into sections known as *A, B, C,* etc.; each section containing a separate portion of the multiple. Thus lines from 0 to 4999 will be found in section *A,* lines from 5000 to 9999 in section *B* and so on. The answering jacks of all the lines are multipled to each section. The subscribers' instruments are fitted with as many buttons as there are sections, and in the directory they are listed with the letter of the section at which their multiple appears. The operation of the calling system is a follows: Suppose No. 1562 *A* should wish to talk with 9876 *B;* he would, in signalling the exchange, depress the button marked *B.* This operation causes the illumination of his line lamp in section *B* and the operator completes the call in the usual way. If a number is wanted in the *A* section then the *A* button must be operated.

This invention particularly relates to boards of this type having only two sections and discloses a circuit arrangement that requires but two relays for its operation, one relay being employed to close the lamp circuits at each section.

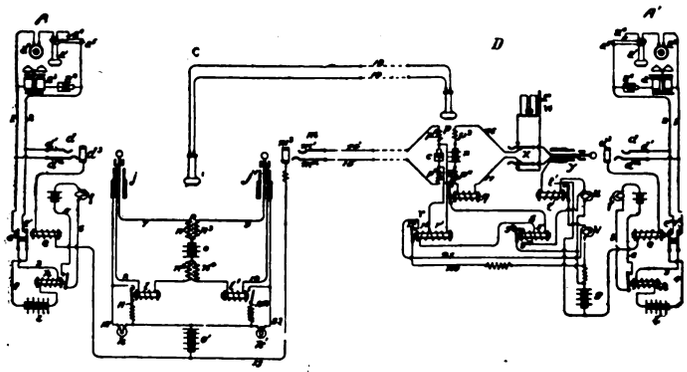
TRUNK SIGNALLING SYSTEM.

Merritt S. Connor, Chicago, Ill., patents and assigns to the Western Electric Company, Chicago, Ill. (No. 820,350; dated May 8th, 1906; filed April 9th, 1900; renewed October 5th, 1905; serial No. 282,063), an improvement in signalling for telephone trunk lines.

This invention consists of arrangements of circuits in connection with specially designed relays for preventing interference with the operation of signals by currents arising from sources foreign to the signalling circuit, such as differences of potential in the earth at different exchanges; and for preventing interference with conversation upon a grounded trunk circuit. The difficulties alluded to are such as have been found by experience to exist upon trunk circuits employing ground returns for signalling. In the invention covered by this patent there is described a circuit containing a source of electrical energy and two signals, with means for controlling their operation which preferably employ no earth returns. The illustration shows a trunk line 14 15, extending from the office C to office D. In this circuit repeating coils, relays, jacks, plugs, lamps, condensers and other features of the circuit are represented by familiar conventions.

The operator at D makes connection with line A^1 on receipt of a notification over the order wire, and the operator at C inserts her plug *J'* in jack *m.* The latter operation causes battery *o* to find a circuit out over the line 14 15 through windings p' and p^2 of the repeating coil *p* and the winding r' of magnet *r,* energizing that magnet and closing the contact r^3. The winding r' of magnet *r,* however, is of so great electrical resistance that it does not allow enough current to flow in the circuit to energize the magnet *l'* sufficiently to close its contact. The signal *k'* therefore remains displayed, its circuit having been completed with the battery *o'* through the plug *j'* and the spring jack *m.* When the plug *y* is inserted into the spring jack *d,* the signal *u* is displayed, its circuit being completed with the battery *g* through the winding of magnet *t,* the plug *y,* the jack *d,* and the winding of cut-off relay *e.* The circuit of the signal *v* is also completed by the closing of the contact *t'*, due to the energization of the magnet *t.* The signal *v,* however, is not displayed, owing to the maintenance of the shunt through the closed contact r^3.

The operator at office D calls the station A', and when he removes the receiver the circuit from the battery *z* through the winding of magnet *q* is completed. The consequent closing of



contact q^2 places a shunt composed of the winding s' of the magnet *s* and of the winding r^2 of the magnet *r* around the winding r' of the magnet *r,* permitting the passage of enough current over the trunk line from the battery *o* to energize the magnet *l'* sufficiently to close its contact, thus shunting out the signal *k'*.

The armature of the magnet *r* is still attracted, partly in virtue of the resistance in the shunt and partly because the winding r^2 energizes *r* by the current which passes through the shunt. At the same time the magnet *s* is energized by the winding s' and closes the contact s^2, which in turn shunts out the signal *u* by the winding s^3, indicating to the trunk operator that the subscriber has answered. The contact s^2 is maintained by the winding s^3 until the withdrawal of the plug *y* from the jack *d* irrespective of the subsequent condition of winding s'.

When the subscriber at A' hangs up his receiver the low-resistance shunt of the winding r' of the magnet *r* is removed, thus sufficiently de-energizing *l'* to permit of the opening of its contacts, which causes signal *k'* to be illuminated. The operator at C then removes her plug causing magnet *r* to be de-energized, allowing contact r^3 to open, removing the shunt from the signal *v* and causing its display as a disconnect signal at the trunk position.

The removal of the plug restores the signal *v* to its normal condition by the opening of contact *t'*, due to the de-energization of the magnet *t.*

TELEPHONE SYSTEM.

Charles B. Smith, New York, N. Y., patents (No. 816,132; dated March 27, 1906; filed November 28, 1898; renewed October 22, 1902; serial No. 128,244).

This patent belongs to that class known as "secret party line systems," and has for its object the design of a system by means of which a subscriber can call the central office or the central office can call a subscriber without disturbing any other station. This the inventor accomplishes by means of three line wires and step by step mechanism at the sub-stations in conjunction with circuit changing switches at the exchange.

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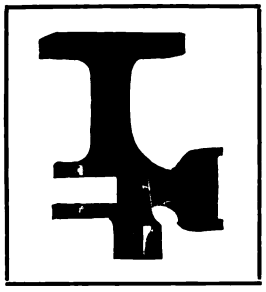
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

FINISHED CASTINGS FOR TELEPHONE PARTS.

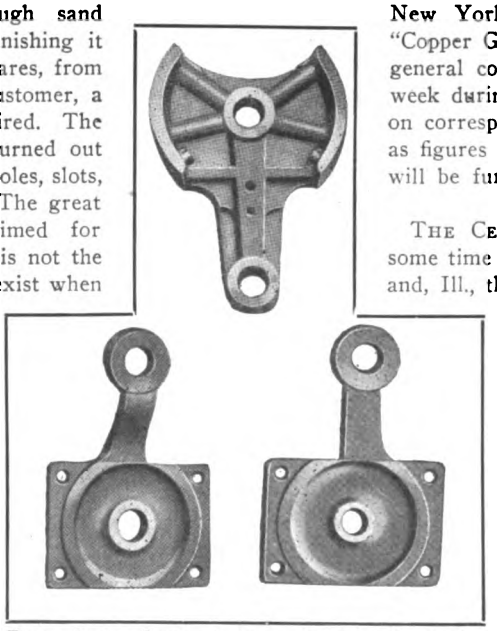
EXTREMELY large sales of its special finished castings are reported by the H. H. Franklin Manufacturing Company, of Syracuse, N. Y. These castings are produced by secret processes, and their favorable reception has contributed in a large degree to the success which has come to this well-known manufacturing company.

The finished castings are made in special dies from an alloy known as "Franklin metal." This material has been pronounced by United States Government experts to be equal in strength to the best quality of cast iron, but is of finer grain, and is suitable for high grade work. It can be japanned or oxidized, and takes a fine nickel plate.



Franklin Metal Casting.

The process by which the castings are made is very interesting. Instead of following the old method of making a rough sand casting, and finishing it by hand or by machine, this company prepares, from blue prints or models furnished by the customer, a steel die, showing the form and finish desired. The castings are made from this die, being turned out in what is practically a perfect state, with holes, slots, lugs and spurs in their proper positions. The great advantage of extreme accuracy is claimed for this method, owing to the fact that there is not the opportunity for variation that is found to exist when the finishing is done by hand or machine under average conditions.



These Parts, Produced by a Special Die Casting Process from Franklin Metal, Have Never Been Subjected to Filing or Other Finishing Process.

One effect of this is to make the parts perfectly interchangeable. The goods can be delivered to a customer true to size as furnished by him upon the drawing, and so finished that not even the stroke of a file is necessary to prepare them for assembling. This should be especially interesting information to manufacturers of telephones and specialties who use small parts in large quantities, and have heretofore been obliged to submit to the delay caused by finishing rough parts as they come from the foundry.

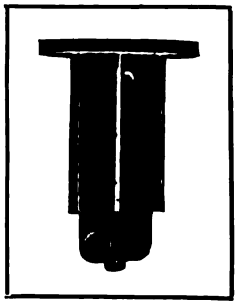
Although various alloys, ranging from fine white metal and aluminum alloys to lower grades where hardness is not required or a lower price is desired, are used by this company, its greatest business is in furnishing castings of the "Franklin Metal." This, on account of its peculiar properties, is said to be especially adapted to the making of many parts used in telephone apparatus. The hardness of the metal makes it very desirable for small gear wheels and other parts exposed to wear which can be accurately cast without any burrs upon their surfaces. An examination of samples shows that the inner surfaces, as well as those outside, are smooth and true. Those who use many small parts in the manufacture of telephone apparatus will do well to write to the company for information and a sample casting.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., has recently closed contracts for complete equipment with the following named telephone organizations: Ovid Telephone Company, Shephardsville, Mich.; Inter-State Telephone Company, Wilsonville, Nebr.; Tedrow Telephone Company, Tedrow, Ohio; Lago Independent Telephone Company, Lago, Ind.; Farmers' Mutual Telephone Company, Ft. Seneca, Ohio; Farmers' Mutual Telephone Company, White Pigeon, Mich.

THE CARBOLINEUM WOOD PRESERVING COMPANY, MILWAUKEE, WIS., has received a very great number of testimonials relative to the superior preserving qualities of its product Avenarius Carbolineum. These letters have been reprinted and arranged in a booklet which can be secured by all parties interested. The company claims that people who have tried this preparation find it cheaper than ordinary paint and much more satisfactory. It is specified by U. S. government engineers for application to all wood work which is to be exposed to the elements, and is recognized as being a sure preventative against the action of the elements and insect life. Prices and full particulars will be mailed on application to the company.

THE NATIONAL CONDUIT & CABLE COMPANY, 41 Park Row, New York, has recently issued a folder entitled "Copper Gossip," which gives figures relative to the general copper market and trade. Prices for each week during April and May of this year, and prices on corresponding dates last year are given, as well as figures on exports and imports. Copies of leaflet will be furnished to those who write the company.

THE CENTRAL ELECTRIC COMPANY has been for some time sending out from its factory at Rock Island, Ill., the Black Hawk dry batteries. These are manufactured especially to provide for the attainment of the longest life and the highest amperage and voltage that are practicable, and are especially designed for telephone work. A corrugated zinc surface is one of the features of this cell, which is said to contribute to the securing of the highest current value. This results in the provision of a very large surface for a given cell diameter, and is said to increase the activity of the cell, and to lengthen its life. The escape of gases which are formed within the cell by the action of the chemicals, and are destructive of the zinc element without contributing to the effective current of the cell, is provided for by a special vent. These features, together with the fact that these batteries are constructed from the highest grade of carbon, manganese and amalgamated zinc, should render them a most reliable product.



Special Form Cast by the H. H. Franklin Mfg. Co.

The Central Electric Company makes some very interesting statements concerning the results of experiments in which its product has been tested in competition with other cells. Details concerning the method of making this cell and its behaviour in service can be secured from the company, which will be pleased to send a full description and prices from its Chicago sales offices, 502 Monadnock Building, upon receipt of a request.

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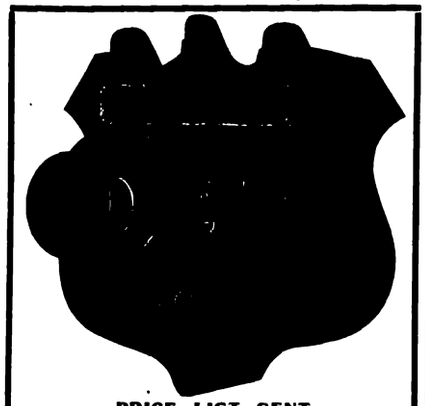
GRAY PAY STATIONS ARE PAYING

122 MORE TELEPHONE COMPANIES HAVE ADOPTED THEM IN TWO WEEKS

They Are Automatic Levers, Springs and Paper WE DON'T USE

GRAY TEL. PAY STA. CO. HARTFORD, CONN.



PRICE LIST SENT

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Cheap, a ten-thousand-dollar telephone system for eight thousand dollars. Best paying system in western Kansas. Address T. F. Poole, Grainfield, Kansas. 630

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—A second hand fifty or one hundred drop switchboard in good condition made by the Sumter Telephone Manufacturing Company. Address F. P. Linder, Hartwell, Ga. 626

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—The issues of THE AMERICAN TELEPHONE JOURNAL dated January 6th and 13th, 1906. Address, stating price, Box 629, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 629

WANTED—Continued

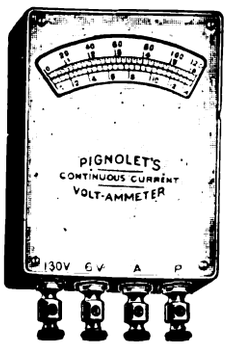
WANTED—Position in purchasing or advertising department of large operating or manufacturing company by energetic young man of experience and ability. Five years in present position. Address, Box 624, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 624

MR. MANUFACTURER, our business is to create and delevop A MARKET FOR YOUR PRODUCT. We can sell your entire output at less expense and risk that you can do it. If you have a good thing but don't know how and where to sell it, write us. Hapgoods Sales Company, 305-309 Broadway, New York, U. S. A. Offices in eight American cities and London, England. 464

POSITION Wanted—Young man, 20 years of age, having two years' electrical experience, desires position with a telephone company where he may have an opportunity to learn switchboard wiring. Address, Box 631, care THE AMERICAN TELEPHONE JOURNAL, 100 William Street, New York City. 631

WANTED—Position as manager of a good exchange. Have had over 5 years' practical experience and am graduate in telephone engineering. Can furnish best of references. Address, Box 632, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 632

THE VALUE OF A MEASURING INSTRUMENT



Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

Does it pay to be informed? You ought to know.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit
78 CORTLANDT ST., N. Y.

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IN THE MANUFACTURING FIELD

A NEW POLE DISTRIBUTION RACK.

THE ability to conveniently distribute wires which all run to stations on the same side of a pole directly from a cable box is secured by the use of the Robinson Pole Distribution Rack illustrated upon this page. This appliance is extremely simple, as it merely consists of two supporting end pieces, which hold in place a rod upon which are mounted a number of porcelain insulators. The racks are made with a capacity for insulators in multiples of five, and therefore any desired number can be readily installed. Moreover, where a 10-pair rack is in place and an increase in the number of subscribers makes it necessary to handle a greater number of pairs of wires a change in the rack can be quickly made without even removing the wires from their fastenings. The upper and lower pieces used for fastening the rack to the pole are heavy, well braced malleable iron castings, with convexed surfaces, and possess sufficient strength to hold any load which is likely to be placed upon them. The use of the convexed surfaces makes it unnecessary to gain the pole, as the casting conforms to the outline of the wood, and in case of the lengthening or shortening of the rack, no blaze is left open to the action of the weather. This appliance is being put upon the market by the W. G. Nagel Electric Company, Toledo, O., which will be pleased to send further information and prices to any one who wishes to obtain them.

The Robinson Distribution Rack, Especially Useful for Taking Off Leads Running from Only One side of the Pole.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has recently issued Bulletin No. 19 which supersedes Bulletin No. 11 dealing with generator call telephones. The contents include telephones for bridging and selective systems, generators, extension bells, desk instruments, arresters, induction coils, ringers, hooks, transmitters and receivers. In all there are fifty pages, each of which is filled with valuable information relative to generator call apparatus. Accompanying the descriptions of the various parts there are eighty-three illustrations which adequately portray the details of the individual pieces of mechanism. Copies can be procured by addressing the company.

THE ADVANCE LUMBER COMPANY, dealer in poles for telephone lines, has recently moved its offices from 559 Rose Building, Cleveland, O., to 1303 Rockefeller Building, in the same city, in order that it might be better located for the transaction of its increasing business.

W. N. MATTHEWS & BRO., 219 North Second street, St. Louis, Mo., have issued a booklet, which, on account of the subject matter and arrangement as well as the typographical work, takes a leading place amongst manufacturers' publications. It deals with the Stombaugh guy anchors, and Kearney cable clamps manufactured by this company. Descriptions of tests of the anchor and explanations of the principles which give it so great holding power, accompanied by a table showing the strain required to pull out the anchor when set at various depths in the ground, are given. The method of using the cable clamp for carrying a cable around a corner in a way which the manufacturers claim to be extremely economical is explained and illustrated by diagrams and photographs. The book is so attractive and interesting that no telephone manager interested in the subject of which it treats should neglect to secure a copy, which may be readily obtained by writing to the company.

JULIUS ANDRAE SONS & CO., 99 W. Water Sstreet, Milwaukee, Wis., state that the use of condensers upon magneto party lines is steadily increasing in popularity. Until this method of using a condenser was devised there was no way to avoid the annoyance caused on a party line by people listening in, and thereby preventing the ringing of the bell of the desired party, if he did not answer at the first call. By the use of a condenser in series with each receiver on a line this difficulty is avoided, as it is possible to ring the bell of any subscriber, regardless of the positions of the book switches of the other subscribers. The Andrae condenser is made in various styles, some of which are especially designed for installation in connection with instruments already in use, and can be mounted and connected readily by even an inexperienced person. A catalogue and descriptive literature will be cheerfully furnished to whoever wishes it by the company.

THE FAHNESTOCK ELECTRIC COMPANY, 129 Patchen avenue, Brooklyn, N. Y., has recently issued a booklet which contains descriptions of several new styles of the Fahnestock Spring Binding Post. Although one of the best known and most important uses of this binding post is in connection with dry batteries, upon most of the leading types of which it is furnished free of charge when specified, practical men have found that it is adaptable to a great many uses about exchanges. It is reliable, and the speed with which a connection may be made when it is used makes it extremely useful. The company will be pleased to send its booklet, which gives prices and descriptions of the various styles, upon receipt of an inquiry.

THE ELECTRIC CABLE COMPANY is fitting up at Bridgeport, Conn., a factory which will be devoted to the manufacture of Voltax, the new insulating compound, for magnet wire, rail bonds and field and armature coils. These coils are to be insulated with the Voltax compound impregnated under a vacuum to insure thorough absorption and to make the product moisture and water proof. The Electric Cable Company reports an increase of fifty per cent. in the sales of its field and armature coils during February and March over the two preceding months.

THE WESTERN TELEPHONE MANUFACTURING COMPANY, Chicago, Ill., is issuing catalogue E which describes at length the different pieces of apparatus it manufactures. The construction of the Western transmitter, receiver, ringer, generator, induction coil and switch hook is very thoroughly illustrated and each particular part is carefully analyzed. Amongst the different types of wall and desk sets, descriptions of which find a place in this catalogue, there are several which embrace new ideas in the design and arrangement of parts. The "Pioneer" instrument conforms in appearance to the common battery wall type, but as this telephone is arranged for magneto service the generator is mounted in the cabinet below the writing shelf. Two distinct types of desk stands are shown. All parties interested can procure a copy of the book by addressing the company.

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Insure Your Poles and Crossarms Against Rot and Premature Decay

by applying to same **AVENARIUS CARBOLINEUM WOOD PRESERVATIVE,** tested by the only admissible evidence—30 years' use in any part and climate of the globe.

Standard Wood Preserver of New York Central Lines, American Telephone and Telegraph Company and other large Corporations.

Guaranteed to double the life of poles with proper application. Comes ready for use, anyone may apply it with a brush or by dipping; no skill nor machinery required.

Enables substitution of cheaper grades for expensive poles.

For further information address Dept. C

CARBOLINEUM WOOD PRESERVING CO.

Sole U.S. Agents **Milwaukee, Wis.**

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WE CAN INCREASE YOUR NET EARNINGS

Carefully designed Systems of Records and Accounting will do it. We are specialists in the designing of such systems. No matter how small or how large your company may be, the adoption of our methods will result in pronounced economies.

To enable us to submit you a detailed proposition, mail us a concise statement of the size and scope of your company, and your prospects for growth, expansion, etc. Such information will be received in strictest confidence.

Accompany the information with samples of forms you are now using, stating defects you would like remedied.

Our experts will then submit a sample outfit of Records, Sheets and forms to meet the individual needs of your company.

Write us to-day.

TELEPHONE SYSTEMS DEPARTMENT

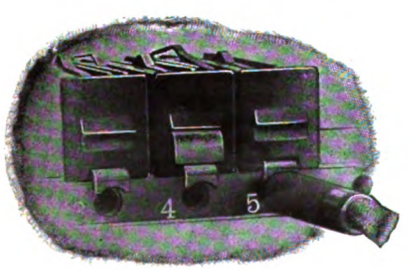
THE Edwards-Hine Co.

5-7 PEARL ST., GRAND RAPIDS, MICH.

The UNITYPE

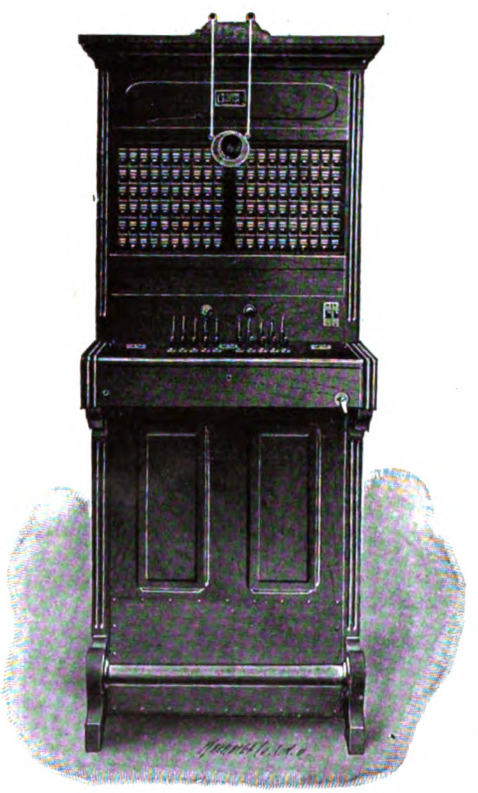
Pat. April 25, 1905

A Short Sermon on Simplicity



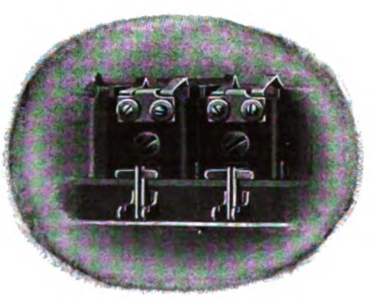
Front View, Three Drops.

When subscriber rings, shutter falls out of slot in drop case. When plug is inserted shutter is mechanically restored. No electrical devices, coils, extra contacts or rubber insulated restoring springs used.



100 Drop Switchboard.

WATCH THIS SPACE and You Will Learn How To Save Money and Gain Satisfaction



Rear View, Two Drops.

Every drop can be removed from the front of the switchboard by simply pulling it out. At the rear are two contact pieces that lock the drop in place.

THE SUMTER TEL. MFG. CO., Sumter, S. C.

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THE WEEK'S MESSAGES

NEW COMPANIES.

MECCA, CAL.—The Coachella Valley Home Telephone Company has been organized by Redlands men. The company's lines will extend from Mecca to Indio. The officers are: President, J. D. Turnbell; vice-president, F. E. Dudley; treasurer, C. C. Abbey; secretary, K. C. Wells. Other Redlands men interested in the company are P. M. Gill and H. W. Johnstone.

EFFINGHAM, ILL.—The Kavanagh Telephone Company, of Effingham, Ill., has been incorporated with a capital stock of $30,000. The incorporators are W. M. Kavanagh, H. N. Munson and M. P. Turner.

HEYWORTH, ILL.—The Heyworth Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are Henry E. Fitchhorn, H. Dale Cline, Charles G. Fitchhorn.

WINNEBAGO, ILL.—The Winnebago & Burritt Mutual Telephone Company has recently been organized, and is to build a line to Rockford.

MARION, IND.—The Citizens Automatic Telephone Company has been incorporated with a capital stock of $300,000. The incorporators are O. L. Barger, H. A. Hamil and E. K. Leyman.

EVEREST, KAS.—The Forest Mutual Telephone Company has been incorporated.

CROFTON, KY.—The West Mt. Zoar & Crofton Telephone Company has been incorporated with a capital stock of $286.00. The company is to build a telephone line through Mt. Zoar. The incorporators are John Lanier, J. W. Durham, F. M. Sizemore, J. F. Fuller, Albert Long, Harlan Durham and others.

MAYFIELD, MICH.—The Flint River Telephone Company has been organized.

RIVES JUNCTION, MICH.—The Rives Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are Fred Marquedart, H. K. Wood, J. S. Wood, L. F. Foster, N. F. Wing, J. M. Fuller, J. B. Christie and Elmer Wood. The business of the corporation is to be conducted at Rives.

ANN CAR, NEB.—The Ann Car Telephone Company has been incorporated with a capital stock of $2,000.

CHADRON, NEB.—The Chadron Telephone Company has been incorporated with a capital stock of $25,000. The directors are J. T. May, A. W. Rickman and L. E. May.

CHAMBERS, NEB.—An Independent Telephone Company has been organized at Chambers with a capital stock of $12,000. The officers are J. M. Jackman, president; J. R. Reitz, vice president; W. H. Graver, secretary; Robert McClannahan, treasurer.

MEXICO, N. Y.—Plans are being formulated for the organization of a new Independent telephone company at Mexico, N. Y. C. I. Miller, of Mexico; Manager Bomster, of the Black River Telephone Company, and John Nellis, of Syracuse, are interested.

RICHMONDVILLE, N. Y.—O. R. Mann and I. J. Harrington, of Richmondville; I. D. Winnie, of Seward, and a party of Sharon men have organized an Independent Telephone Company to operate a line from Richmondville to Seward, Sharon and other towns.

WAVERLY, N. Y.—The Elliston Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are A. C. Ellis, W. H. Ellis and H. A. Ellis, Waverly, N. Y.

NEW HILL, N. C.—The Cape Fear Telephone Company, at Bensal, Wake Co., has been incorporated with a capital stock of $575.00. The incorporators are M. J. Baling, L. E. Rollins, T. L. Womble and E. E. Mills, all of New Hill.

CADIZ, O.—The Farmers' Telephone Company, of Cadiz, has been incorporated with a capital stock of $1,000. The incorporators are A. M. McCombs, James Love, J. M. Megaw, S. E. Adams and L. M. Peck.

MALVERN, OHIO.—The Malvern Telephone Company has been incorporated with a capital stock of $4,000. The incorporators are F. E. Hoffee, J. A. Rhiel, J. C. Lewis, Fred Smith and G. B. Richards.

MARIETTA, O.—The Mile Run Mutual Telephone Company, of Marietta, has been incorporated with a capital stock of $2,500. The incorporators are W. F. Watkins, L. F. Winn, Jesse Thomas, Roger Fish and J. S. Wynn.

GUTHRIE, OKLA.—The Northwestern Telephone Company has been incorporated with a capital stock of $520.00. The incorporators are D. M. Sowers and Otto Burst, of Guthrie; Albert Metzger, of Coyle.

ROSSVILLE, OKLA.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $2,000.

FREDERICKSBURG, VA.—An Independent Telephone Company has been organized at Fredericksburg, and will run lines from Louisa Courthouse through Spottsylvania, Hanover and Goochland counties.

STEWARTSVILLE, VA.—The Roanoke & Bedford County Telephone & Telegraph Co. has been incorporated with a capital stock of $5,000. The officers are R. L. Dearing, president, Vinton Va.; J. W. Meador, vice president, Stewartsville, Va.; J. A. Jeter, general manager, Stewartsville; A. L. Dickinson, treasurer.

FRANKFORD, W. VA.—The Frankford Telephone Company has been organized with a capital stock of $6,000. The incorporators are S. F. Tyree and others.

SHINNSTON, W. VA.—The Shinnston Union Telephone Company has been incorporated with a capital stock of $4,995. Incorporators are A. M. Hess, C. L. Lyon, L. L. Smith, L. D. Martin, R. W. Shinn and others.

CHILLIWAC, B. C., CAN.—An Independent Telephone Company is being organized at Chilliwac, and will construct 65 miles of lines. Address S. A. Cawley, care Cawley & Paisley, Chilliwac, B. C.

NEEPAWA, MAN., CANADA.—An Independent Telephone Company is being formed at Neepawa for the purpose of building rural lines to be connected with the town system. Address George R. Benton, Neepawa, Man.

MOUNT ALBERT, ONT., CAN.—The Mount Albert Telephone Company has been formed with a capital stock of $10,000. The company will construct lines in Scott and Uxbridge townships. Address T. Graham, township of Uxbridge, or W. D. Stokes, township of Scott, Ont.

FRANCHISES.

MT. UNION, IA.—The Henry County Telephone Company, which recently applied for a charter at Mt. Union, has been granted one for a period of twenty years.

BOSTON, MASS.—The Boston Independent Telephone Company has applied for a franchise at Boston.

BOSTON, MASS.—Application has been made by the Massachusetts Home Telephone Company for permission to operate a telephone system in Boston.

SARANAC LAKE, N. Y.—The Adirondack Home Telephone Company, which has recently established an exchange at Potsdam and obtained a franchise at Malone, has applied for a franchise at Saranac Lake. These are the same people that control the Clinton Telephone Company of Plattsburgh, N. Y.

SCHENEVUS, N. Y.—Orra L. Tipple has been granted a franchise at Schenevus, and is to organize a new Independent Telephone Company to operate in opposition to the Bell sub-licensee company.

HILLSBORO, TEX.—W. T. Smith, of Bynum, has been granted a franchise to construct a telephone system from Bynum to Hillsboro, Massey, Brandon and other points.

SUNNYSIDE, WASH.—The Farmers Independent Telephone Company has applied for a franchise at Sunnyside.

FINANCIAL.

JONESBORO, ARK.—The Automatic Home Telephone Company has increased its capital stock to $100,000.

NEWARK, ILL.—The Farmers' & Merchants' Telephone Company has increased its capital stock $15,000.

MONTEVIDEO, MINN.—The Citizens Telephone Exchange Company has increased its capital stock to $50,000.

HUMBOLDT, NEB.—The City Mutual Telephone Company has increased its capital stock to $25,000.

ALBANY, N. Y.—The United Message Company has increased its capital from $10,000 to $10,000,000. This company is a holding company designed to take over the stock of the Independent companies in the eastern and central part of the State. Among the stockholders are Howard Hendrickson, William A. Hendrickson, H. M. Teator, F. E. Griffin and C. J. Crummey.

COLUMBUS, OHIO.—The Citizens' Telephone Company has declared its usual quarterly dividend of 1 per cent. on its common stock.

COMBINATIONS.

VINSON, OKLA.—W. A. Ambler has sold his telephone business to G. F. McCauley.

ALLENTOWN, PA.—The Consolidated Telephone Company has leased for a term of 999 years the Easton & Bethlehem Telephone Company. It has also purchased the Honesdale Telephone Company and the Berwind Telephone Company, and will at once commence developing and extending these lines.

ELECTIONS.

MEADOWS, IDAHO.—The Meadows-Warren-Roosevelt Telephone Company has elected the following officers: T. B. Snyder, president; T. J. Ford, vice-president; A. B. Lucas, secretary; A. R. Krigbaum, treasurer; F. M. Hubbard, general manager.

ALBION, ILL.—The Edwards County Mutual Telephone Company has

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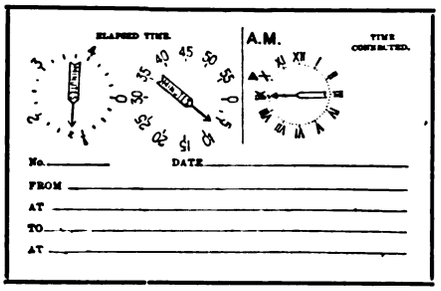

CALCULAGRAPH RECORD—EXACT AND INDISPUTABLE.

Which Method Do You Use for Timing Toll Conversations?

THIS—OR—THIS

The Calculagraph

increases the earning capacity of your toll lines. It makes no clerical errors.

WRITE FOR BOOKLET

Date _____ No. _____
From _____
At _____
To _____
At _____

Time Connected A.M. P.M.		No. of Minutes Connected	Time Through	
Hour	Min.		Hour	Min.
7	19	4	7	23

PENCIL AND CLOCK RECORD—UNCERTAIN AND EASILY DISPUTED.

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YOU LOSE SUBSCRIBERS

because of the little things in the business. There is little difference between one man and another, but that little counts for a great deal. It is the little things that count.

We have been making dry batteries for eighteen years and every year we have tried to make them a little bit better than the year before. In doing so we think we have helped to lessen telephone troubles, and helped the telephone business.

The "1900" dry battery is one of the little things that make for perfection. Try it.

The Nungesser Electric Battery Co.
CLEVELAND, OHIO

General Sales Office, 128 W. Jackson Boulevard
CHICAGO, ILL

CORDS : CABLES WIRES

We Manufacture

Cords for Telephones and Switchboards
Cables and Wires for Switchboards
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SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

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97-101 South Clinton Street, Chicago

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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THE WEEK'S MESSAGES

elected the following directors: O. A. Bunting, Ellery; Edson Gould, Sr., Bone Gap, and Fred Waxler.

DAVIS, ILL.—The Davis Mutual Telephone Company has elected the following officers: President, Jas. Yale; secretary, Daniel Thiel; treasurer, Fred Alberstett.

ELDORADO, IA.—The Iowa River Telephone Company has elected the following officers: President, J. S. Quiggle; vice president, John Windecker; secretary, G. W. Stotser; treasurer, Joe Huse.

BERGEN, N. Y.—The Bergen Telephone Company has elected the following officers: President, George R. Fuller, of Rochester; vice president, A. A. Sands; secretary, C. M. Beattie, of Rochester; treasurer, C. E. Housel.

SCHENECTADY, N. Y.—The Schenectady Home Telephone Company has elected the following directors: C. F. Veeder, E. S. Kellogg, H. C. Hequembourg, H. E. Webster, A. J. Quackenbush, J. M. Andrews, C. E. Palmer, Jas. McNaughton, Howard Hendrickson, S. B. Rawson, T. M. Brush, I. H. Griswold, F. H. Sudro, J. W. Smitley and Homer Strong.

CRESTLINE, O.—The Crestline Local Telephone Company has elected the following directors: Jacob Babst, A. H. Kinsey, J. F. Morkel, C. R. Callagham, F. A. Knapp, Fred Wolfram and G. A. Wright.

PERSONAL.

JAMES T. DANIELS has been appointed manager of the Central Union Telephone Company's exchange at Columbus, O.

W. F. DOUGLASS has been promoted to the management of its exchange at Prospect and Radnor, O., by the Central Union Telephone Company.

C. H. EDWARDS, who has been district manager in charge of the North Dakota division of the Northwestern Telephone Exchange Company, has been promoted to the management of the St. Paul district.

LOUIS S. GREENLEAF, general superintendent of the Hudson River Telephone Company, has been appointed general manager of the company to succeed the late Henry E. Hawley.

DAVID LAIRD, who has for the past four years been manager of the exchange of the Southern Bell Telephone & Telegraph Company at Richmond, Va., has been appointed superintendent of the fifth district, with headquarters at Savannah, Ga.

AUSTIN L. HATCH, formerly in charge of the exchange of the Colorado Telephone Company at Canon City, has been appointed traveling auditor, with headquarters at Denver.

H. HENNES has recently taken the management of the People's Telephone Company at Spring Valley, Minn.

THOMAS F. KEAVENY, who has been manager of the exchange of the Colorado Telephone Company at Las Vegas, N. M., has been transferred to the larger exchange at Canon City, Col.

D. M. THERRELL, formerly superintendent of the seventh district of the Southern Bell Telephone & Telegraph Company, with headquarters at Charleston, S. C., has been promoted to the superintendency of the second district, with headquarters in Atlanta, Ga.

MISCELLANEOUS.

LEAF RIVER, ILL.—Connections are soon to be established between the Leaf River & Egan Mutual Telephone Company and the Illinois Mutual Telephone Company of Seward.

EDMONTON, ALB., CANADA.—The council has ratified an agreement with the Canadian Machine Telephone Company to install a Lorimer Automatic system, which will be operated and controlled by the city. Address Mayor May or City Electrician Ormsby.

New Construction in the Field

PIGGOTT, ARK.—The Home Telephone Company is to build a line from Piggott to St. Francis.

MASCOUTAH, ILL.—The Looking Glass Prairie Telephone Company is about to build a line over the eastern section of St. Clair County, with exchanges at Mascoutah, Summerfield, Trenton and Lebanon.

HUNTSVILLE, ALA.—The Inter County Telephone Co. has spanned the Tennessee River and will have connection with the Huntsville exchange within a short time. This will put the city in telephone communication with a majority of the villages and communities of Morgan and Marshall counties south of the river.

NEWARK, ILL.—The Farmers' & Merchants' Telephone Company is to construct lines to Seneca and Marseilles.

CHARLES CITY, IA.—The Rural Telephone Company is to build seventy miles of additional line.

BARNARD, KAS.—The Farmers' Telephone Company is to build a line to Minneapolis.

HUDSON, KAS.—The German Valley Telephone Company is to build a new line.

REED CITY, MICH.—The Citizens Telephone Company will soon commence construction work on its Davenport line.

BLAKELEY, MINN.—The Farmers & Merchants Mutual Telephone Company is to build a line from Blakeley to Belle Plaine.

WINONA, MINN.—The Winona Telephone Company is to make improvements in its Rushford exchange, and will build a new line from Rushford to Winona.

QUINCY, MO.—The Quincy Home Telephone Company is arranging to build toll lines between Quincy and St. Louis via Hannibal, also between Quincy and Kansas City.

CREIGHTON, NEB.—The Camp Dewey Telephone Company is extending its lines.

GENEVA, NEB.—The Fillmore County Telephone Company is improving its service at Geneva.

HARRISON, NEB.—The Moyer Telephone Line, which has been completed to Crawford, is to be extended to Lusk. This will give Harrison connections west to Cheyenne and Casper and east to Omaha.

WYMORE, NEB.—The Home Telephone Company is constructing its plant at Wymore.

SANTA FE, N. M.—The Santa Fe Telephone Company expects to make many improvements and extensions in its system.

EAST SYRACUSE, N. Y.—The Independent Telephone Company, which has purchased the East Syracuse line, is rebuilding the local system.

ROME, N. Y.—The Rome Home Telephone Company is to greatly improve its system in Rome and the surrounding country.

WATERVLIET, N. Y.—The Home Telephone Company is extending its lines in all directions in the south towns of the county.

FREMONT, OHIO.—The Home Telephone Company is to build a rural line from Fremont to the Maumee Pike.

TOLEDO, O.—The Toledo Home Telephone Company is installing a switchboard extension which will provide for the connection of 1,400 more telephones. The company is also busy putting in four-party lockout telephones on the East Side and the service is thus far working very satisfactorily.

YUKON, OKLA.—The Canadian Farmers' Telephone Company is extending its lines to El Reno, Piedmont and Okarche.

DALLAS, TEXAS.—The Independent Telephone Company is constructing its system at Dallas.

BRIDGEPORT, W. VA.—The Belmont Telephone Company is to extend its lines to Kirkwood Heights.

HUNTINGTON, W. VA.—The Huntington & Teays Valley Telephone Company is to rebuild its lines between Barboursville and Hurricane.

DURAND, WIS.—The Durand Light & Power Company is constructing a telephone line from Durand to Meridean, and expects to construct several other telephone lines.

EAST TROY, WIS.—The Eagle Telephone Company is about to extend its lines to Troy Lakes.

MELROSE, WIS.—The Central Wisconsin Telephone Company is to spend $10,000 in improving its system in Melrose.

NEKOOSA, WIS.—The Nekoosa Telephone Company is to rebuild its system at Nekoosa, and will also install a new switchboard.

PINE GROVE, WIS.—The Brown County Telephone Company is to build a line from Langes to Denmark.

RICE LAKE, WIS.—The Barron County Telephone Company is to construct a new line at Rice Lake.

WELCOME, WIS.—The Metteston Telephone Company will install an exchange at Welcome.

ST. JOHN, N. B., CAN.—The Central Telephone Company, of Sussex, will install an exchange at St. John. The company expects shortly to increase its capital stock to $1,000,000.

DARTMOUTH, N. S.—The Nova Scotia Telephone Company is to install a new exchange at Dartmouth, and is to change its system to a complete metallic circuit.

BRANTFORD, ONT., CAN.—The Canadian Telephone Machine Company has commenced the construction of its system.

CHIHUAHUA, MEXICO.—The Chihuahua Telephone Company is to put in a new line from Chihuahua to the Santa Eulalia mining camp, with a central station at Santa Eulalia.

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OUR MOTTO—QUALITY AND PROMPT SHIPMENTS.

KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

We have recently published a little book giving some very valuable information about Cedar Poles. It contains Specifications, Inspection Comments, Shipping Data, Etc. "Yours for the asking."

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Manufacturers of

PRESSED STEEL GUY CLAMPS

WE GALVANIZE BY THE HOT PROCESS

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POLES

THE F. BISSELL COMPANY. TOLEDO, OHIO.

CHESTNUT—CEDAR—CYPRESS

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GLENN-KLINE LUMBER CO.

WHITFIELD BLDG., PITTSBURG, PA.

CHESTNUT POLES

J. I. M. WILSON COMPANY

Wholesale Producers

Bessemer Building PITTSBURG, PA.

POLES

20 and 25 foot lengths for rural telephone lines a specialty.

PORTER CEDAR CO., Saginaw, Mich.

WHITE CEDAR POLES

Buy from the Producers and Save Jobbers' Profits.

PENDLETON & GILKEY - Minneapolis, Minn.

We Make a Specialty of Telephone Poles.

POLES

Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines

YARDS: Menominee, Mich. Escanaba, " Cloquet, Minn. Heron, Mont. Cabinet, Idaho. Chicago, Ill.

FRANCIS BEIDLER & CO. 459-519 W. 22d St. CHICAGO, ILL.

WHITE CEDAR POLES

Longest Lasting Best Grade

40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st

25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

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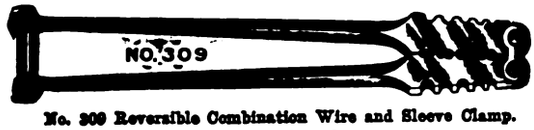
W. C. Sterling & Son Co., Monroe, Mich.



No. 309 Reversible Combination Wire and Sleeve Clamp.

Send a two-cent stamp for 48-page catalogue.

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MATHIAS KLEIN & SONS

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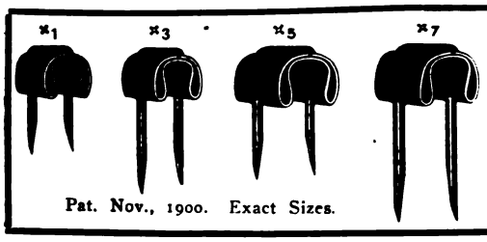

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Blake Insulated Staples
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Manufactured and For Sale by

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246 Summer St., Boston, Mass.

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CARD INDEX SYSTEM
Especially Designed For
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Blanks, Books and Forms for Telephone Exchange and Toll Line Book-keeping and Accounting.
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Write for Sample Forms and Prices.
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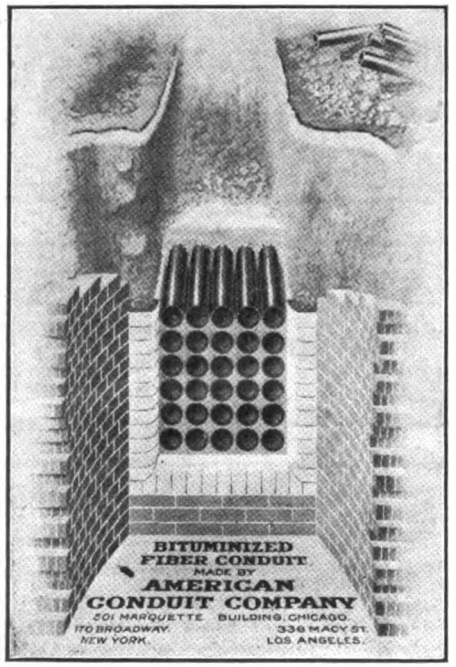

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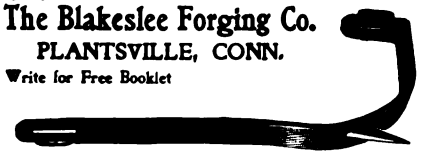

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STANDARD PORTABLE DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Volt-ammeters, Milli-ammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.
Our Portable Instruments are recognised as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.
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HIGH GRADE PLIABLE, TOUGH, UNIFORM. EXTRA DOUBLE GALVANIZED
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Experts in Underground Conduit Subway Construction
THE BUTTERFIELD CONSTRUCTION CO.,
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"He boasts that he doesn't advertise, but he's doing business still at his old stand."

"He means he's doing business at his old standstill."—*Philadelphia Press.*

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WE would like to send you samples of our Eaco Steel Cord, because it is made right and will overcome the difficulties so often found in cords. ¶Samples and quotations on request.

ELECTRIC APPLIANCE COMPANY

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Telephone Manufacturers

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THE GOULD PLATE

The large contact surface for the active material of the Gould plate is *developed out of the lead of the blank itself*—not by the removal of any metal but by our special process of "spinning" the surface of the lead blank into the numerous ribs.

We employ only chemically-pure lead, dense and uniform throughout.

The Gould plate retains its initial capacity longer than any other type. For telephone work it is unequalled. Complete estimates upon request.

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Type SW Terminal. No pothead necessary. Equipped with carbons and tubular fuses.

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POLE CABLE TERMINALS AND JUNCTION BOXES

FOR

Multiple Tap Cable Distribution

Cook's Terminals furnish the most approved forms of protection, and the best and simplest means of cable distribution.

Cook's Junction boxes are best for cable splicing. They can be used in conjunction with the terminals or alone. At points where you desire to dead-end your cable use Cook's Junction Box. You can add a cable Terminal later if you wish.

SELF SOLDERING NOZZLES

Are Furnished With Both Terminals and Boxes

WRITE FOR PLAN FOR YOUR CABLE LAY-OUT

Frank B. Cook

238 West Lake St., Chicago, Ill.

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A PIONEER

North's concealed binding post, self-contained, removable shell receiver, the prototype of his new receiver as above shown, was first offered to the telephone user in 1897.

From the start its novel design, free from all exposed metal parts so dangerous to the user, its permanency of adjustment, substantial construction and ready accessibility were recognized as a great improvement over the old types then in use.

Other manufacturers were quick to see its advantages and imitators were soon in the field. To-day you will find few receivers offered except those modelled after NORTH'S.

The attention of the user is called to the fact that The North Electric Company owns letters patent No. 663,196 and No. 670,564, controlling this type of receiver.

THE NORTH ELECTRIC COMPANY

KANSAS CITY CLEVELAND DALLAS

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CENTURY
100 % GOOD

DOLLARS FOR YOU!

You operate your telephone system for profit.
You wish the profits were larger.
How to make them so puzzles you.

THERE'S A WAY

Cut down your maintenance cost.

This can be done by using telephone equipment, the development of which is the result of many years' practical exchange operation.

We have constructed and operated a large number of exchanges.

Our profits were increased by putting only the very best of material and workmanship into our apparatus.

Because our trouble bills were smaller.

Yours will be also.

We can prove to you that we can increase the earning capacity of your exchange system.

WRITE US TO-DAY

You will find it to your advantage to know about our complete line of local and common battery telephone equipment.

CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

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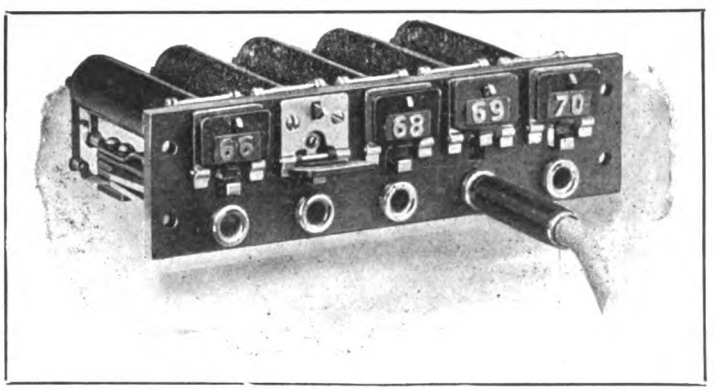
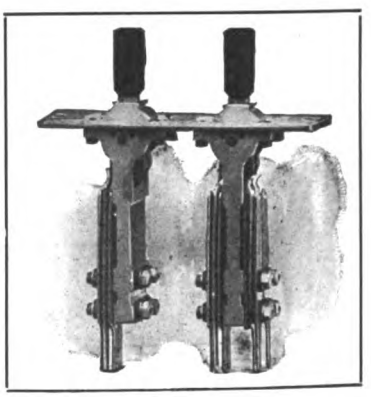
MONARCH

THE two most important parts of the switchboard being the line signal and the ringing and listening key, we illustrate a strip of Monarch drops and jacks and a Monarch ringing and listening key with ring back. These parts have now been on the market for a period of two years, and during that time they have proven themselves to be most efficient and durable. The fact that the armature of the drop is mounted in front of the coil and that the coil can be removed without breaking any soldered connections and without disturbing the armature is a feature that is appreciated by all practical telephone men. The additional advantage secured from this construction is that the adjustment of the armature is positive and permanent.





The ringing and listening key shows the same careful consideration of small details which is so apparent in all Monarch equipment. The mountings for the springs are solid brass so formed as to afford a most substantial support. The springs themselves are made of German silver and the contacts are pure platinum rivets. Little features of this kind will interest anyone in the market for switchboard equipment and an investigation will pay.

A complete exhibit of Monarch Telephones and Switchboards will be found in Room 642 and 644 during the National Interstate Telephone Association Convention, June 26th, 27th and 28th.

Monarch Telephone Mfg. Co.
CHICAGO, U.S.A.

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DEAN TELEPHONE APPARATUS

A Gratifying Evidence of Progress

Nothing can show more clearly the strides made by our engineers in getting up the best telephone apparatus than does the business which we are receiving.

A call at rooms 614 and 616, in the Auditorium Hotel, Chicago, at the National Telephone Convention, to be held June 26, 27 and 28, will convince you of the superiority and efficiency of our equipment.

BRANCH OFFICES

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Kansas City, Mo.

542 Byrne Building
Los Angeles, Calif.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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To Our Friends and Patrons

THE National-Interstate Telephone Association will hold its Annual Convention at the Auditorium Hotel, June 26th to 28th, and in accordance with the policy pursued by this Company for several years, instead of placing a few switchboards and pieces of apparatus made especially for the occasion on exhibition, we will open the doors of our plant to the Convention and make our entire factory our exhibit. Our plant constitutes an exhibit of which we are justly proud, and it is not possible to give an adequate idea of its size, operation, and product in any other way.

Representatives of the company will be at the Convention, who will take pleasure in showing you through all of our departments and explaining every detail. During the Convention we will have several large and up-to-date automobiles in constant service between our factory and the hotel.

We sincerely trust that you will remember this invitation and that we may have the pleasure of extending to you any courtesies in our power.

Kellogg Switchboard & Supply Co.

Congress and Green Streets **CHICAGO, ILLINOIS**

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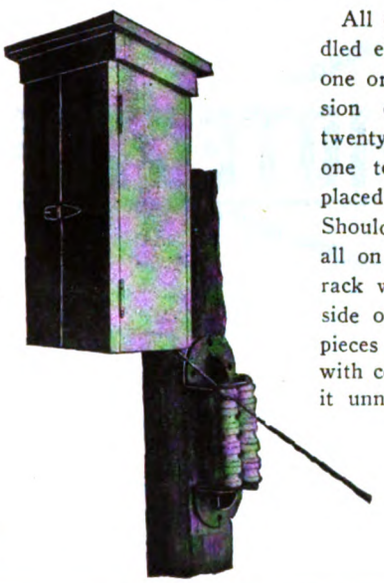
Robinson Pole Distribution Rack

(PATENT PENDING)

SIMPLE INEXPENSIVE PRACTICAL

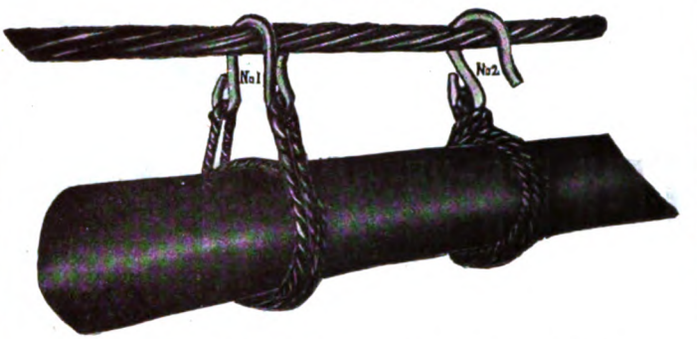


All drops can be easily handled either by placing rack on one or both sides as the occasion demands. In case of twenty drops equally divided, one ten pair rack would be placed on each side of pole. Should the twenty drops be all on one side, a twenty pair rack would be placed on that side of pole. Top and lower pieces heavy malleable castings with convexed surface, making it unnecessary to gain pole.

Send for Catalog No. 8 of Nagel Specialties

Swisher Marline Cable Hanger

(PATENT APPLIED FOR)



In the above illustration we show in figure No. 1 the Swisher Marline Hanger, in figure No. 2 the old style now in common use. The advantages we claim for the Swisher Hanger are: First, easy to install. Second, greater strength. Third, hook cannot become detached from strand. Fourth, hook cannot straighten under strain and let cable down. Fifth, in stringing of wires over cable, wires sagging will not catch under hook as in old style. Sixth, after cable has been installed, same can be pulled without opening the hooks.

We use only the best grades of marline and No. 9 hooks galvanized after forming. Our No. 9 hook on account of its construction will stand a greater strain than a No. 6 hook of old style.

The W. G. NAGEL ELECTRIC CO., 26-30 St. Clair Street TOLEDO, OHIO

COMBINED

CASH REGISTER AND PAY STATION

Records all Deposits. Issues a Cash Ticket with Every Collection.

CASH ALWAYS ACCOUNTED FOR

NO ERRORS NO DISPUTES NO TROUBLE

A Tape Numbered from 1 to 2,000 Does the Work.

NO CONFUSIONS OF SOUNDS

The Signals are all given from ONE gong.

ONE RING for **5** cents.
TWO RINGS for **10** cents.
FIVE RINGS for **25** cents.

On opening the cash box the tape is cut off and deposited in the money box, thus providing a check or cash ticket to be taken to the Auditor with the money.

The UNITED STATES COIN REGISTER CO.

TOLEDO, OHIO

32 St. Clair St.

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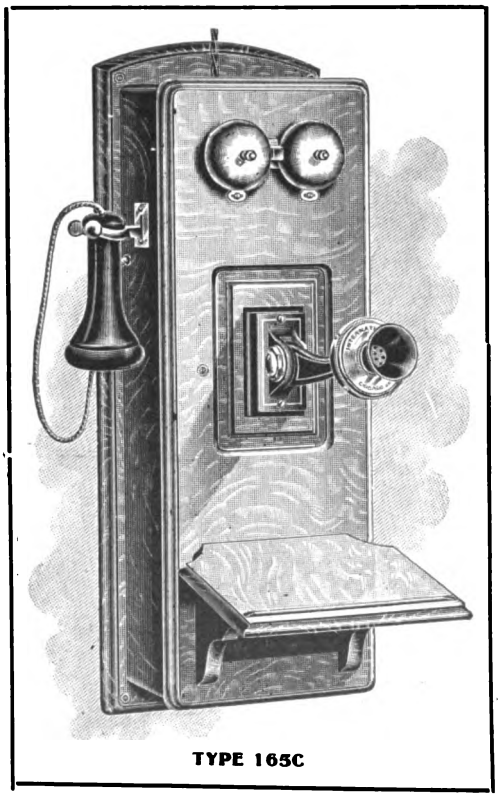
TELEPHONES STERLING PROTECTORS

TRADE MARK
STERLING ELECTRIC COMPANY.
LAFAYETTE, IND.

MANUFACTURERS OF

HIGH GRADE
TELEPHONE EQUIPMENT



TYPE 165C

$—2—U

If you want a telephone that you can put out on your rural party line and give absolutely the best service and one that will save you many a long expensive drive out into the country, get the

International

All connecting wires, binding posts and terminal screws fully concealed, preventing these parts accidentally becoming disconnected.

No exposed metal parts in the circuit, avoiding danger from lightning while using the instrument.

We Will Send You One On 30 Days Approval

INTERNATIONAL TELEPHONE MFG. CO., HARRISON & CLINTON STS. CHICAGO

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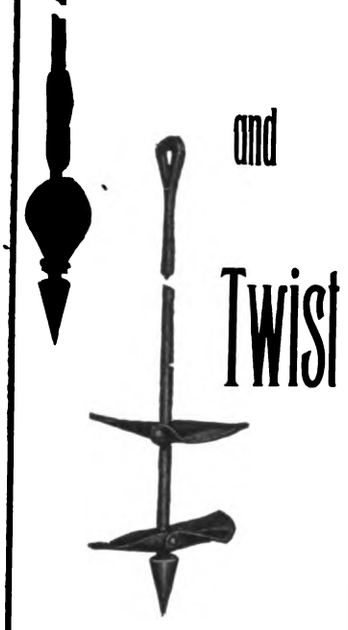

and

Twist

SPEED

is important in line construction.

The D. & T. ANCHOR

can be installed in one twentieth of the time required for any other type.

Designed so as to be easily set in hard and stony ground.

Will hold anywhere.

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THE D. & T. ANCHOR CO.

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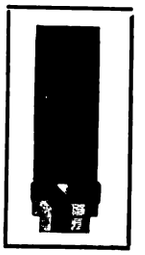
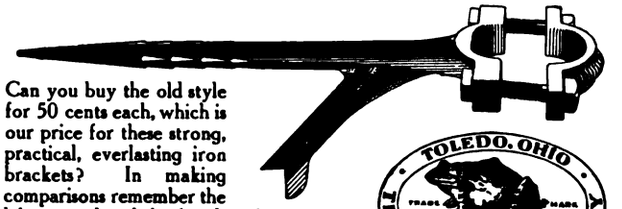
A REDUCTION THAT MEANS SOMETHING



We have made **NOVELTY POTHEADS** so cheap that it is both wisdom and economy to discard the old style sleeves. Not even expert lead wipers can compete. Any ordinary man can install our **Novelty Potheads** with his own tools.

The Prices, Not the Quality, Have Been Lowered. We also make **sleeves** for straightaway, and two and three branch splices. *Write immediately for Catalog 199*

Our **SECURITY POTHEAD BRACKET** is malleable iron and linemen may stand upon it without danger. Can this be done with the old wooden block bolted or tacked to the poles?



Can you buy the old style for 50 cents each, which is our price for these strong, practical, everlasting iron brackets? In making comparisons remember the labor saved and the freedom from vexatious breakdowns.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK

Write for Bulletin 189

THE F. BISSELL COMPANY, TOLEDO, O.

BELDEN JUMPER WIRE

is a tinned copper conductor, insulated with single or double silk wrapping and one outside cotton braid.

STANDARD COLORS

RED WHITE BLUE

Made single or duplex conductors and saturated with bee's-wax compound or treated with BELDEN flame-proofing solution.

For further particulars write to

BELDEN MANUFACTURING COMPANY

194 MICHIGAN STREET

CHICAGO

"They Never Pull Up"

THE MILLER SAFETY ANCHOR

Elmer P. Morris Co.

51 Dey Street - NEW YORK

Eastern and Export Agents

THE MILLER ANCHOR CO., Norwalk, O.

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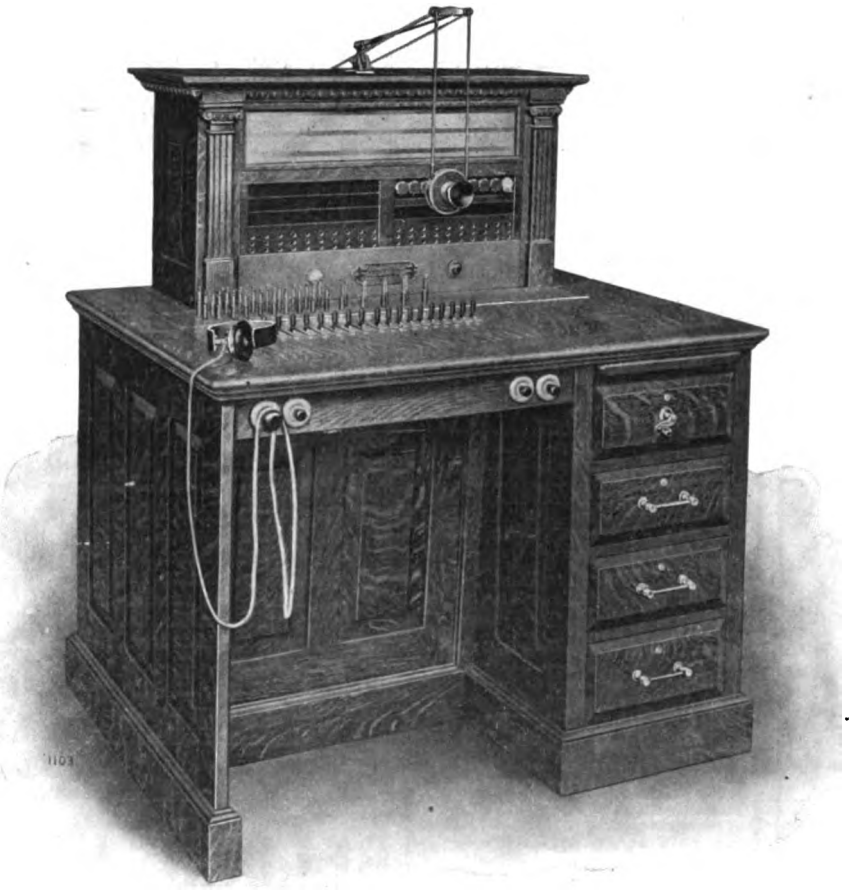

DO you realize the importance of the Private Telephone System? There is nothing which makes the operating exchange stronger than by connecting with Private Branch Exchange and Intercommunicating systems.

We are giving this branch of our business special attention and have produced some specially designed cabinets to meet the prevailing conditions and will equip them with any number of lines desired, allowing ample room for growth.

The same ideals of integrity of material and craftsmanship which are responsible for the Popularity and high Standard of Perfection of the STROMBERG-CARLSON APPARATUS are to be found in every detail in the Private Exchange and Intercommunicating equipment.

We invite you to look into and consider this very profitable branch of the business, and solicit your inquiries.

Write at once for Bulletin 14-B.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N. Y. **CHICAGO, ILL.**

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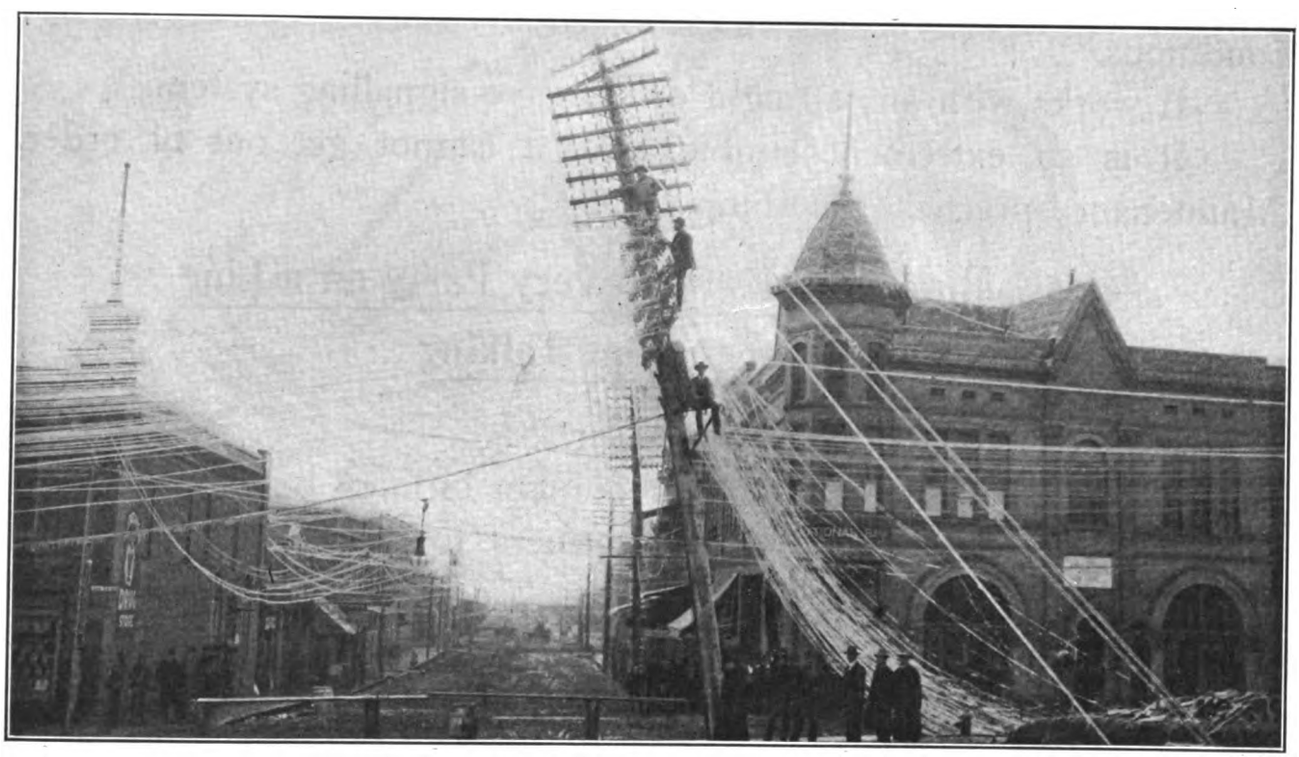
WE MAKE CABLE

DANGER

Danger to people and instruments from contact with light or power wires---danger that interrupted service will cause the company to lose subscribers---danger that the same thing will happen again if the company doesn't replace its open wire leads with cable.



WHAT A STORM DOES TO TELEPHONE LINES---CABLE IS SAFE

Conservative policy requires that you substitute cable for your open wire leads. Once properly installed it will remain in good order with very little attention. Stromberg-Carlson Cable is the best that experience, trained engineers and careful manufacture can make. Booklet 79B will tell you about cable. Write for it.

STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

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NOW

If we had started this ad. with LOCK-OUT you would have passed it up, but we didn't. We know that nine out of every ten telephone men grow cynical when party-line lock-outs are mentioned.

THE POOLE LOCK-OUT SYSTEM WORKS

It works on ANY make of central energy telephone under all conditions.

It works with any straight or selective signalling system.

It is so extremely simple that it cannot get out of order. Maintenance practically nothing.

It Absolutely Locks Out Every Party on a Line Except the One Talking

Primarily, then, it is a rate raiser.

Operators can handle greater number of lines, being relieved of the necessity of arguing with subscribers to decide who shall use the line.

No central office equipment required---it is merely an attachment to the subscriber's instrument.

THE IDEAL PARTY LINE

Where's the exchange manager who would not be interested if he were certain it would operate successfully.

Let us tell you more about it, or, better still, see it operate at the Chicago Convention, June 26, 27, 28 and 29.

MANUFACTURED BY

THE MOUNTAIN STATE ELECTRICAL COMPANY

No. 911 MARKET STREET, WHEELING, W. VA.

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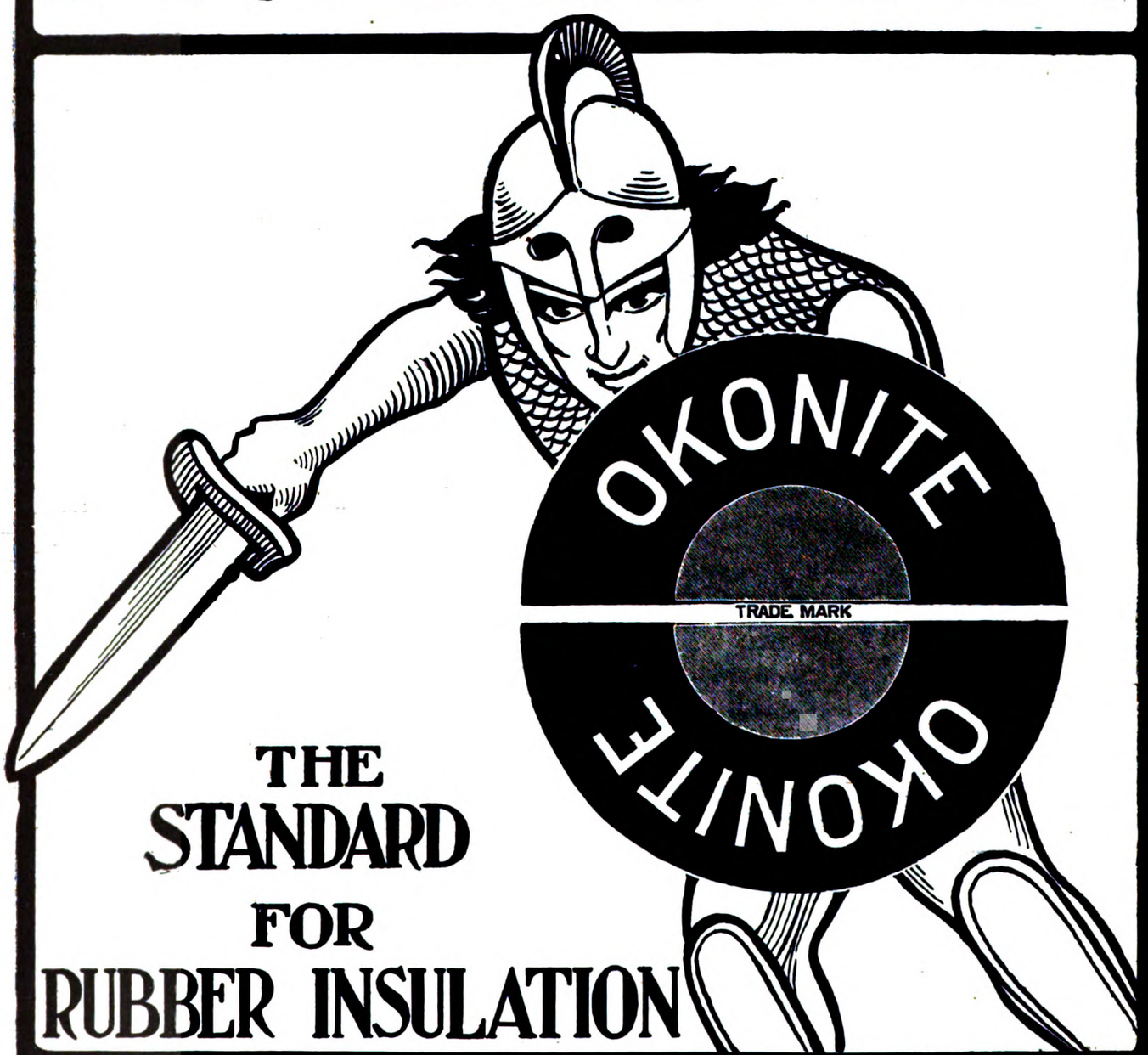

THE STANDARD FOR RUBBER INSULATION

The OKONITE COMPANY *Ltd*

Manufacturers of Insulated Wires and Cables

253 BROADWAY NEW YORK CITY.

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PITTSBURG - - PA.

LINE CONSTRUCTION MATERIAL

Crossarms, Pins, Wire Insulators, Brackets, Braces, Bolts, Lightning Arresters, Fuses, Etc.

We are carrying one of the largest stocks of general LINE CONSTRUCTION MATERIAL in the world.

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THE TALK OF THE CONVENTION

The V-B Common Battery Ballast Switchboard
The only common battery switchboard which successfully operates without relays.

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The only ringer in which all adjustments are accomplished by the use of only a screw driver.

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YOU WILL BE INTERESTED IN OUR COMBINATION TYPEWRITER DESK AND COMMON BATTERY SWITCHBOARD, FOR LARGE INTERIOR TELEPHONE SYSTEMS. EXPERT STENOGRAPHER AND OPERATOR IN ATTENDANCE. IF YOU HAVE ANY MAIL TO GET OFF, SHE WILL BE GLAD TO TAKE YOUR DICTATION, AND IT WILL ONLY COST YOU A SMILE.

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THE VOTE-BERGER COMPANY

Makers of First-Award
TELEPHONES AND SWITCHBOARDS
LA CROSSE, WIS., U. S. A.

The Automatic Electric Company

INVITE YOU TO VISIT THEIR

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DURING THE

National-Interstate Independent Telephone Association Convention at Chicago, June 26th, 27th and 28th

They will be pleased to receive at either place the delegates and visitors to the Convention for the purpose of demonstrating the Automatic Telephone System

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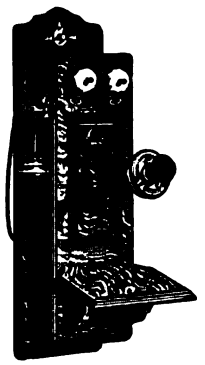

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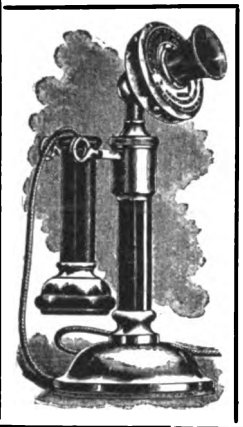


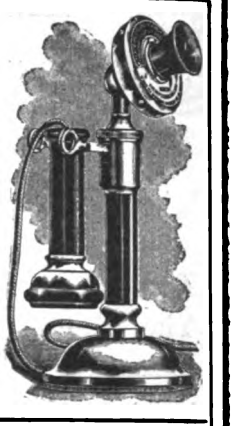
If You Attend the Convention

this year you should bear in mind **Room 612,** where our exhibit will be located. If you do not attend the convention, do the next best thing and ask for our literature.

In buying Swedish-American product you are assured of getting the best the market affords, and at a price in keeping with quality offered. We solicit an opportunity to prove our claims to **you.**

Swedish-American Telephone Co.
Chicago

BRANCHES: 115 West 6th Street, Kansas City, Mo. 615 Bee Building, Omaha, Neb. 112 Broadway, Fargo, N. Dak.



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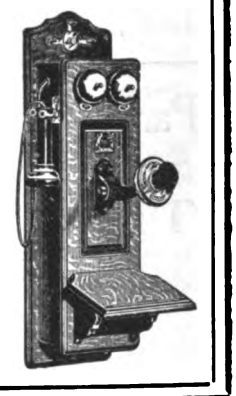

Telephone Wire and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — Aerial—Underground—Submarine Lead Covered Cables

TERMINALS-STEEL STRAND—HANGERS

Standard Underground Cable Company
PITTSBURGH, PA

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Frankel's Electric Testing Clips
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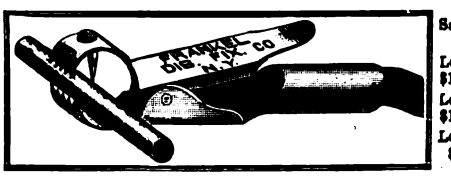
No more baring the wires. No lineman's grip complete without them.



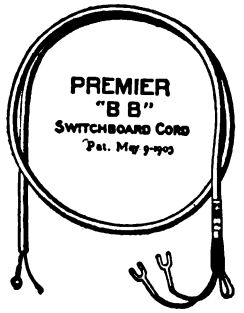
Sample doz. $1.50 doz.
Lots of 100, $11 hundred
Lots of 500, $10 hundred
Lots of 1000 $9 hundred

Patented Nov. 15, 1904.

The teeth grip the line or binding post. The pin pierces the insulation and makes a perfect test connection

FRANKEL DISPLAY FIXTURE CO., 740-742 Broadway, N.Y.

ONE OF OUR SPECIALTIES



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Write for Sample

WE manufacture Cords, Cables and Wires for Telephone and Electrical Purposes. Cords and prices right and deliveries prompt. Correspondence invited.

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VOLUME XIII *SATURDAY, JUNE 23, 1906* *NUMBER 25*

Look For The Shield!

THEODORE GARY, 1ST VICE-PRESIDENT.
JOHN VAN LIEW, 2D VICE-PRESIDENT.

J. G. SPLANE, TREASURER.
A. L. TÊTU, SECRETARY.

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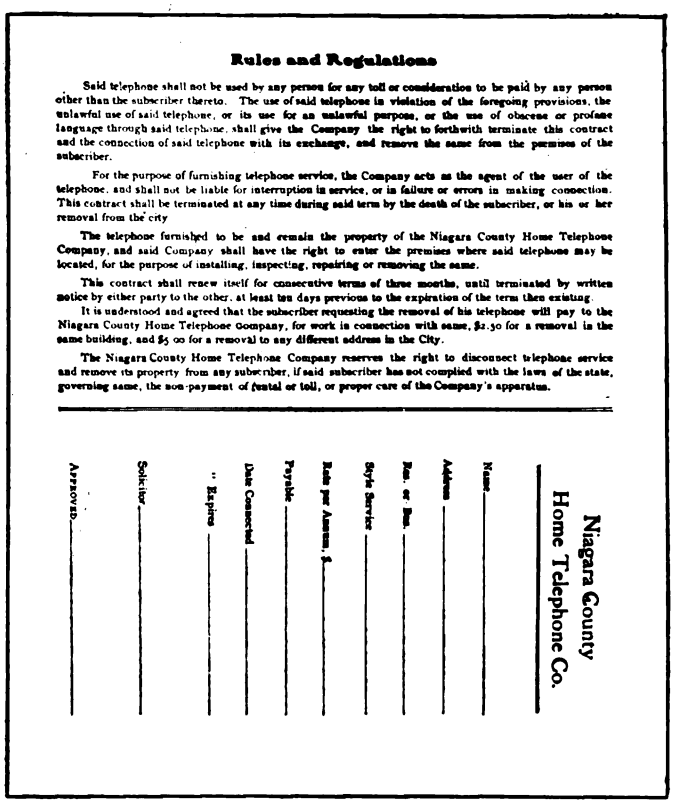
Niagara Falls---the Up-to-Date Telephone Plant

ARTICLE I. SYSTEM IN EXCHANGE MANAGEMENT.

By R. M. Eaton.

OPERATING a system covering the County of Niagara, with three large exchanges in three cities of the county, a great number of rural lines, and toll connections to all important points in Western New York State, the Niagara County Home Telephone Company is increasing the number of its subscribers at a rate which is remarkable even in these days, when the telephone business is proceeding at a pace beyond all predictions..

The problem of meeting the present and constantly increasing demands for its service and promoting extensions of the system in such a way that it shall be normal and healthy and serve the greatest number of subscribers well and profitably is one which in itself is sufficient to fully engage the attention and employ the best efforts and utmost energy of the general manager. To give the time and freedom from minor duties so essential for the successful upbuilding of the plant, it is necessary that all details of operation and extension should be so arranged as to fit one into



Rules and Regulations

Said telephone shall not be used by any person for any toll or consideration to be paid by any person other than the subscriber thereto. The use of said telephone in violation of the foregoing provisions, the unlawful use of said telephone, or its use for an unlawful purpose, or the use of obscene or profane language through said telephone, shall give the Company the right to forthwith terminate this contract and the connection of said telephone with its exchange, and remove the same from the premises of the subscriber.

For the purpose of furnishing telephone service, the Company acts as the agent of the user of the telephone, and shall not be liable for interruption in service, or in failure or errors in making connection. This contract shall be terminated at any time during said term by the death of the subscriber, or his or her removal from the city

The telephone furnished to be and remain the property of the Niagara County Home Telephone Company, and said Company shall have the right to enter the premises where said telephone may be located, for the purpose of installing, inspecting, repairing or removing the same.

This contract shall renew itself for consecutive terms of three months, until terminated by written notice by either party to the other, at least ten days previous to the expiration of the term then existing.

It is understood and agreed that the subscriber requesting the removal of his telephone will pay to the Niagara County Home Telephone Company, for work in connection with same, $2.50 for a removal in the same building, and $5 00 for a removal to any different address in the City.

The Niagara County Home Telephone Company reserves the right to disconnect telephone service and remove its property from any subscriber, if said subscriber has not complied with the laws of the state, governing same, the non-payment of rental or toll, or proper care of the Company's apparatus.

Approved_____ Solicitor_____ ... Expires_____ Date Connected_____ Payable_____ Rate per Annum, $_____ Style Service_____ Bus. or Res._____ Address_____ Name_____

Niagara County Home Telephone Co.

Fig. 1. One side of contract form used by the Niagara County Home Telephone Company.

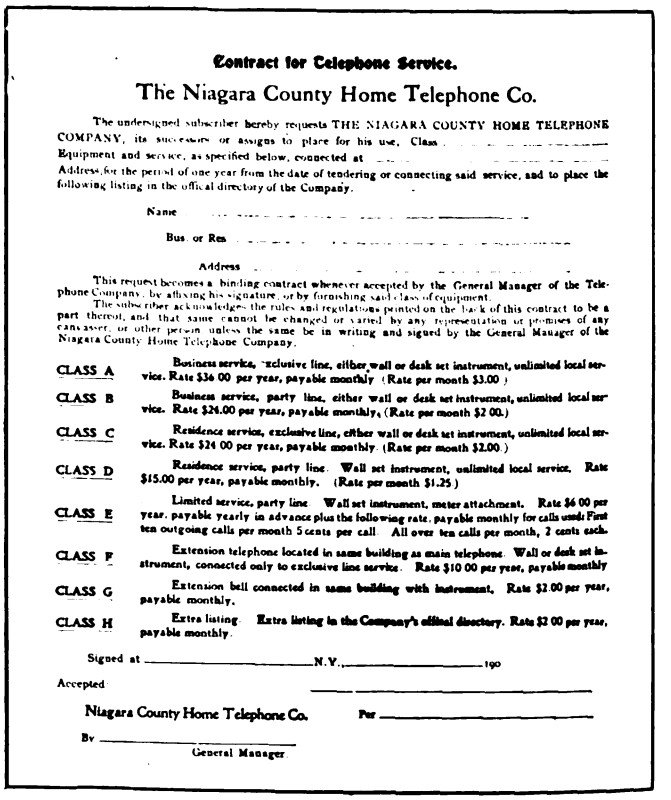
another with the utmost precision, so that in the regular course of a day's work the ordinary business of the company may be conducted properly and efficiently by the employes in the various departments.

A system has been put in operation which enables each one of a well trained group of employes to carry on his or her work along a predetermined line, taking each step with a definite foreknowledge of what shall come afterward, so that the accomplishment of each duty leads definitely toward a known result, and one department checks another in all subordinate proceedings. When the final result is reached it may be relied upon that the processes that have brought it about are almost certain to be without error, entailing the least practical amount of clerical work and recording, and have caused the slightest possible amount of friction.

In planning the system two principles were taken as fundamental. One of these is that all work be done in accordance with definite instructions, issued by the general manager and completely covering all regular cases, unless a valid reason for departure from the rules is shown to a person with authority to permit a variation. The second is that all reports shall be made and tests conducted and recorded in such a manner that checking shall be performed in all cases where essential, that such checking shall be economical and, so to speak, automatic, as conducted between one department and another, and that all written information furnished shall form a part of a useful permanent record.

In the ordinary routine of installing an instrument, for instance, the first step is the securing of the contract. The solicitor who takes the contract is a man who is fully informed as to rates and all other knowledge which has a bearing on his work. No man is allowed to go out until, through careful instructions delivered by the general manager, he is thoroughly acquainted with the propositions which he must handle. Service is furnished either upon a direct or a party line, at a business or a residence rate, and this simplicity of charges affords little basis for confusion. Furthermore, the wording and the arrangement of the contract itself, which was specially arranged with this object in view, is intended to be so simple and so direct that any subscriber by its mere perusal may be sufficiently informed of the exact nature of the agreement into which he is entering.

When the contract has been signed by the subscriber, it is delivered by the solicitor to a clerk who places it upon the desk of the general manager for approval. Assuming that it is acceptable business and a proper contract, it is "O. K.'d" and returned to the clerk. She makes out installation cards in duplicate for each contract, and attaches to them a drop order slip.



Contract for Telephone Service.

The Niagara County Home Telephone Co.

The undersigned subscriber hereby requests THE NIAGARA COUNTY HOME TELEPHONE COMPANY, its successors or assigns to place for his use, Class ... Equipment and service, as specified below, connected at ... Address, for the period of one year from the date of tendering or connecting said service, and to place the following listing in the offical directory of the Company.

Name ...

Bus. or Res ...

Address ...

This request becomes a binding contract whenever accepted by the General Manager of the Telephone Company, by affixing his signature, or by furnishing said class of equipment.

The subscriber acknowledges the rules and regulations printed on the back of this contract to be a part thereof, and that same cannot be changed or varied by any representation or promises of any canvasser, or other person unless the same be in writing and signed by the General Manager of the Niagara County Home Telephone Company.

CLASS A — Business service, exclusive line, either wall or desk set instrument, unlimited local service. Rate $36 00 per year, payable monthly (Rate per month $3.00)

CLASS B — Business service, party line, either wall or desk set instrument, unlimited local service. Rate $24.00 per year, payable monthly, (Rate per month $2 00.)

CLASS C — Residence service, exclusive line, either wall or desk set instrument, unlimited local service. Rate $24 00 per year, payable monthly. (Rate per month $2.00.)

CLASS D — Residence service, party line. Wall set instrument, unlimited local service. Rate $15.00 per year, payable monthly. (Rate per month $1.25)

CLASS E — Limited service, party line. Wall set instrument, meter attachment. Rate $6 00 per year, payable yearly in advance plus the following rate, payable monthly for calls made First ten outgoing calls per month 5 cents per call. All over ten calls per month, 2 cents each.

CLASS F — Extension telephone located in same building as main telephone. Wall or desk set instrument, connected only to exclusive line service. Rate $10 00 per year, payable monthly

CLASS G — Extension bell connected in same building with instrument. Rate $2.00 per year, payable monthly.

CLASS H — Extra listing. Extra listing in the Company's offical directory. Rate $2 00 per year, payable monthly.

Signed at _____ N.Y., _____ 190

Accepted _____

Niagara County Home Telephone Co. Per _____

By _____ General Manager

Fig. 2. Contract form. A double sheet with each half printed front and back as shown, is provided. One half is returned to the subscriber when the contract has been accepted.

The contract is dated to show the day installation orders are issued, and held in a basket or drawer assigned to this use to await the return of the installation orders. The duplicate installation cards, with the drop order attached, are forwarded to the

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wire chief who arranges for the installation of the instrument.

The wire chief detaches the drop order slip temporarily and files the duplicate installation cards to await the running of the line to the premises of the subscriber. The drop order slip which has been detached is read to the foreman of a "drop gang" over the wire. This foreman is required to carry with him a small vest pocket blank book. When he calls up the wire chief for work he is given a number of orders, one of which will be assumed to be the one whose progress we are tracing. He enters in his book the name and address of the subscriber, together with the class of service, and proceeds to lay out the work. If the order calls for party line service he will select the most convenient line to the new subscriber, call central office on this line, ask what the call number is, and if the call number happens to be a party line number he will get a connection with the wire chief, give his name and state: "This is call number —. Can I put another party on it? (Mr. Blank, No. —, —— street.)" If the wire chief has a spare "party" number on this line he will notify the "drop man" whether to go ahead and make his attachment, or select some other line. If the "drop man" is told to select some other line he will take the next most convenient one and go through the same routine, repeating it, if necessary, until he receives an O. K. from the wire chief, when he will be told the letter of the call number which will be assigned to the subscriber. This letter he enters in his book, and proceeds with the work of running the drop.

R. M. Eaton, General Manager of the Niagara County Home Telephone Company.

If the order is for a direct line the "drop man" calls up from the nearest cable box, and is assigned an idle pair of conductors by the wire chief.

The wire chief immediately obtains from the chief operator a verbal assignment of a line and answering jack, and cross connects on the main frame the cable conductors which he has assigned to the switchboard. This is to enable the "drop man" to call central when his work is completed. When the wire chief has given his O. K. for a call number to the "drop gang" he places that number on the duplicate installation cards, and opposite the number of the assigned cable conductors in his cable record book.

After receiving an assignment and recording it the foreman of the "drop gang" proceeds with the running of the wires.

If a "drop man" reports that additional equipment or a line extension is required for running a new order this work is handled by the construction foreman. The wire chief takes a memorandum of what is required and forwards it to the construction foreman. When this memorandum is returned with a memorandum that the work has been completed the drop order is reissued by the wire chief.

If the "drop man" is "held up" for right of way over private property, he reports the fact to the wire chief, drops that job for the time being and proceeds with his next order. The wire chief attaches a written report of the "right of way" required to the drop order and returns both to the clerk. It is then referred to a solicitor or the general manager, depending on the importance of the "right of way" required, and when this has been secured the order is reissued.

Definite rules are issued to the foremen of the "drop gang" upon a typewritten sheet for his permanent instruction and guidance. These rules are worded as follows:

"Lineman running drops will interview the subscriber, find out from him the approximate location of the new instrument, and run the drops to as convenient a point as possible, for the attachment of the inside wiring.

"Drop wires will not be carried into the building, but will be terminated on suitable knobs or brackets, at the most convenient point for entrance.

"When a drop comes in a window, attachment should be below the window rather than above it, except where the drop comes to a cellar window, when the judgment of the lineman may be used.

"Where old drops are in good condition, and go to the proper terminal pole, new drops may not be run, but in his memorandum the lineman will mark "old drops satisfactory."

"Lineman will not install protectors, but these will be installed by the men doing the inside wiring and installing the instrument. For the linemen's information, however, it is well to know that protectors will be installed on all lines over 150 feet in length, from the pole junction box to the subscriber's station, or where the drop wires cross above or below any foreign wires, regardless of their length.

" 'Drop men' must, on commencing a drop, get line and call number from the wire chief, and on completion of the work must call the wire chief from the extreme end of the drop and secure an 'O. K.' test from him, both open and closed.

"The lineman in charge of running the drops will be held responsible for the correctness of the work and all controversy with the subscribers.

"All work will be inspected before being accepted as satisfactory."

When the drop is completed the "drop man," in accordance with his instructions, calls up from the extreme end of the drop and gets an "O. K." from the wire chief before proceeding with the next order. The fact that the drop has been tested, with the date and time, is entered upon the original drop order by the wire chief and it is then placed in the drawer of the "trouble shooter" who is to inspect and accept the work.

Installing the instrument is the next step. One of the in-

DROP ORDER

Name Butler Grocery Co.

Address 211 Falls St.

Call No. ..... Cable C-2 Box 7 Pair .....

Remarks Direct Subscriber Set near pair conductors in Butlers Alley box

Date Completed Mar. 2 10 A. M.

Lineman Seeber

Slip filled out by wire chief as a record of drop gang's work. This slip is made out in the office, and order given over the wire.

NIAGARA FALLS

No. 198 Name Butler Grocery Co.

1 Bus. Groceries Fruits and Provisions

Address: 211 Falls Street

Extra List .....

Add. Equipment EXTENSION STATION

2 Rate 46 cts 3 Payable M 4 Cable C-2

Style Service BUSINESS. 5 Conductor 44

6 Style Instrument PO 7 Box 207

Date Connected 3/2-06 8 Box Location Butlers Alley

Form used for Subscribers' card records. From chief operator's file are omitted items Nos. 1, 2, 3, 4, 5, 6, 7, 8; from wire chief's items, Nos. 1, 2, 3; from regular office files items Nos. 4, 5, 7, 8.

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stallation cards is given to an installer. The duplicate is held at the wire chief's desk until the installer shall receive his O. K.

Upon receipt of his card the installer obtains from the stock room the instrument and letter called for by each card, together with the wire and other material necessary for his work, and proceeds to the subscriber's station. Like the "drop man" he is supplied with written instructions which convey sufficient information concerning the general method of performing his work, the tools with which he should provide himself, etc. These rules are as follows:

INSTRUMENT INSTALLER'S INSTRUCTIONS.

These Instructions Must Be Conformed With, and Carelessness in Doing So, on the Part of Any Installer, Will Be Sufficient Cause for Dismissal from the Company's Employ.

"Where wires are brought into the building, a piece of twisted pair outside drop wire will be used, brought in through ½-inch circular loom; one hole only being used.

The protector will be placed on the outside wall of the building at the termination of the line wires, or inside, directly where the wires come through the wall or window; in these cases, the installer is to use his own judgment. Protectors will be installed only on such lines as are over 150 feet in length from the cable box, or where they cross above or below any foreign wires.

"Where protectors are installed, a ground wire must be connected, running to the nearest water pipe; if this is not convenient, a piece of galvanized iron rod or gas pipe may be driven into the earth at the side of the building, no less than 3 feet in length, and the wire wrapped around it not less than 6 times. The point of contact between the iron and the wire must be perfectly clean.

"Inside wiring must be done neatly and the instrument placed to conform with the subscriber's wishes. Subscribers may have wall or desk set instruments, as desired, except on residence party lines, when a wall instrument only is allowed.

"Where inside wires are run in damp places, through basements, or in any place where moisture is liable to accumulate, they must be run on split knobs, small size. When the 'run' is absolutely dry, and to all intents and purposes will remain so, the wire may be stapled.

"All joints must be soldered.

"'Rain loops' must be left on all outside wires.

"Installers doing work must properly fill out the card given them and return it to the clerical department upon the completion of the work.

"When an installation is completed the installer must call the wire chief, receive his O. K., and 'time' before the job is left. The wire chief will test for clear line, 'condenser kick,' and the ringing of subscriber's bell.

"All work will be inspected, and no unsatisfactory or unworkmanlike job will be passed.

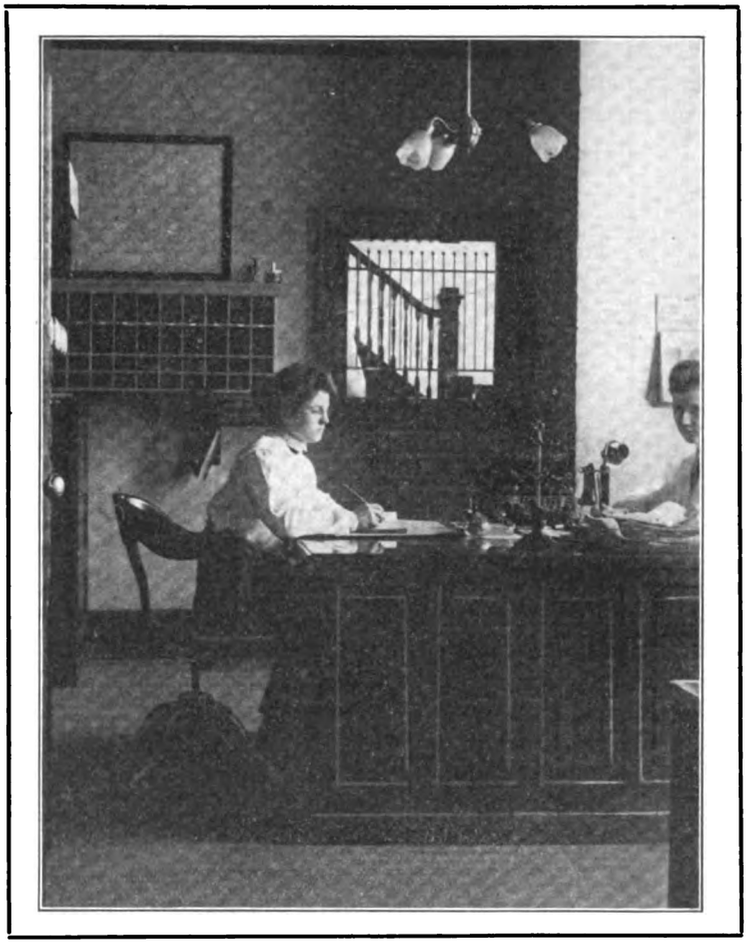
"Installers will equip themselves with the following tools:

"1 brace (angle or ratchet),
"1 long bit, size sufficient to take circular loom.
"1 Syracuse drill.
"1 long gimlet bit.
"1 pair side cutting pliers.
"1 pair long nosed pliers.
"1 hammer.
"1 small key hole saw.
"2 sizes screw drivers, one small and one large.
"1 alcohol flame torch.
"1 small gimlet.
"1 coarse flat file.

"(Special tools, socket wrenches, etc., will be furnished by the company.)

"Installers must report to work in a cleanly condition, and neat in appearance. While on the work they must conduct themselves in a gentlemanly manner, and use all courtesy to the subscribers.

"No voluntary information must be given subscribers as to the company's business, or anything pertaining thereto. For general information the subscriber should be referred to the office of the company."



A Corner of the Clerical Department, Showing Wicket Leading to Stock-room. The Set of Pigeon Holes at the Left is Used for Holding Bills Awaiting Collection.

At the time the instrument is cut into service the installer is required to deliver to the subscriber the regular directory of the company's subscribers and also number cards, as well as a toll directory, if the subscriber wishes to have it.

Upon completion of the work at the subscriber's station the installer immediately calls up the wire chief, giving the call number, name and address of the subscriber, and after the test receives the O. K. of the wire chief. Upon receipt of this O. K. he fills out his installation card. Upon return to the office at night his card is turned in to a clerk at the office. In order to avoid unnecessary communication between employes, with the consequent interruption of the performance of their duties, a basket is left beside the wicket between the stock room and the clerical office. This wicket, which may be seen in the partial view of the general office accompanying this article, was expected at the time the building was planned to provide a means for handling a number of features of the company's business in a very satisfactory way, and has fully justified the hopes which were entertained.

After its receipt from the installer the card is held by the clerk until the arrival of the duplicate which has been held by the wire chief. This duplicate is filled out by the wire chief at the time the O. K. is given to the installer. From it data are transferred to the cable record, and the subscriber's station card record. These two records are the only ones which are kept by the wire chief. After the facts concerning the installation have been noted the wire chief forwards his installation card to the chief operator.

When she receives this card, the chief operator immediately

EMPLOYEES REPORT.

Name Butler Grocery Co.
Address 211 Tabb St.
Reported to me to-day as follows: that they would like to have their instrument changed to a wall set and moved to rear of store.

Date June 7-06 Signed C. Simpson
Employer

Referred to

Report Used by Employee for Transmitting Information Concerning Work at Subscriber's Station Which Should Be Done by Another Department.

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calls up the subscriber and informs him that he is now connected. She tells him his call number, states that it is the chief operator who is talking, and that if any trouble occurs at any time she will give it prompt attention if he will report it to her. She makes sure that he is satisfied in every particular and gives him to understand that she will from that time on take a personal interest in securing for him the most satisfactory service. At the same time she asks him if he is accustomed to use toll lines, and endeavors to find out the principal points to which he talks. She makes sure that he understands that he can obtain good service to the points which he mentions. She also tells him how to take advantage of the special "10 cents for one minute" toll rate to nearby towns and cities, which offers so many interesting features that it will be described in a later article devoted to the operating features of the plant. The subscriber is asked if he desires to be listed in the directory by any other name than that which is entered on the card. If he does, she finds out his wishes,

INSTALLATION ORDER. No.....

Exchange. NIAGARA FALLS. ..... Call No. .....
Name .. Butler Grocery Co. .....
Address ..... 211 Falls Street .....
Style Service. BUSINESS (Direct) .....
Style Instrument D.D.B. ..... No. ..... Meter No. .....
Cable C-2 ..... Pair 91 ..... Box 7 .....
Issued by A. Lynch ..... Date Mar 2, 06
Installed 3. 00 ..... a. m. p. m. Date Mar 2 06
Note .....
Installer's Name C. Simpson .....
O. K. R. Fraser ..... W. C. J. Fields ..... C. O.

Installer must fill out necessary information and return card to office when work is finished.—No installation allowed without card.

One of Duplicate Installation Orders, as it Finally Reaches Clerk, Bearing Complete Information.

or suggests additional listings which she believes it would be to his advantage to have. As examples of these may be mentioned the following: Under I, 12—42—Y International Theatre; under T, 12—42—Y Theatre, International; under L, Lumberg, Harris, Manager International Theatre. The chief operator at this time makes a ringing test, which, in connection with the conversation with the subscriber, assures her that no trouble can exist upon the line at the time of the installation. From this time on she is responsible for the service, and if any complaints are made they come to her. She therefore takes the most genuine personal interest in seeing that everything is perfectly satisfactory at the time the installation is made, and if she discovers the slightest defect takes the proper steps to have it promptly rectified. The talk which she has with the subscriber has been found to be very useful indeed in promoting the understanding that everything possible will be done to give him the prompt and efficient service which he needs and assists in building up the cordial interest which is so satisfying a feature of the relations between its subscribers and the telephone company.

It is to be noted that this test by the chief operator is the second check upon the installation, and it is a safe proposition that no trouble which will interfere with the service will be likely to exist after the installation has been passed by both the wire chief and herself. After the test she makes out her card record and fills out the interleaved directory from the installation card, signs it, and sends it downstairs to the clerk.

The two duplicate cards are now for the second time in the hands of the clerk, with all information filled in, showing that the installation has been correctly made, all necessary records made in the two departments through which it has passed, and the subscriber is receiving satisfactory service. They are checked to see that the figures as to time and date, noted by the wire chief and the installer respectively, correspond, and that "O. K.'s" have been properly affixed by both the wire chief and the chief operator. The form on the outside of the contract is then filled out from the information on the cards. From the contract a directory listing card is made, containing all the information concerning the subscriber necessary for a general office card index and which also acts as a catalogue file as it is filed alphabetically. The contract is then given to the secretary, who makes the entry in the regular subscribers' ledger.

Although the subscriber's instrument is in service and all records complete at the time the processes we have traced have been completed there remains one more important step before the installation is asssumed to be satisfactory. This is its acceptance by the "trouble shooter." This employe has assigned to him each morning by the wire chief the troubles which have accumulated during the preceding night. He also takes out the drop order slips for new installations which have been completed and pronounced O. K. When, in the course of his work of clearing trouble, he is near one of the stations covered by a drop order slip in his possession he visits it and inspects it. He goes over the wiring, and inspects it thoroughly from the cable box to and including the instrument. If the work is unsatisfactory to him in the slightest particular he describes the faults on an "employe's report" slip, which he affixes to the "drop order" slip and returns to the wire chief. The man who made the installation is then sent out to remedy the faults, the routine of testing by the wire chief and chief operator is again gone through with, and at his convenience the station is visited for the second time by the "trouble shooter." If he again finds that the work is unsatisfactory he reports the fact, and the installer or drop man who is responsible is sent out to make the work conform to the standard. This time, as a penalty, he is compelled to do the work on his own time. It has seldom been necessary to enforce this penalty.

If, as is usually the case, the installation is satisfactory, it is accepted by the "trouble shooter," and the fact noted on the "drop order" slip. After this the "drop men" and installers are relieved of all responsibility, which thereafter rests upon the "trouble shooter." As this employe is interested in making his work at the same time as light and efficient as possible the effectiveness of this plan may be readily understood. As a matter of fact, the entire work of clearing trouble and inspecting stations in the Niagara Falls district, where there are over 2,000 telephones, is handled by one man. This should indicate that the system described results in a very satisfactory class of work from the installation force. (*To be continued.*)

MINNESOTA COMPANY CONNECTS RURAL SUBSCRIBERS WITH PRACTICALLY THE ENTIRE STATE.

EXTENSIVE toll connections are furnished to its subscribers by the Winona Telephone Company, of Winona, Minn. This company operates exchanges at Rolling Stone, Lewiston, Rushford and Lanesboro, in addition to the main office at Winona. A most rapid growth has been experienced by the company during the past year, the number of subscribers having increased by about 25 per cent. An extensive system of lines into the surrounding country has been built. Connected with the lines leading into the exchanges of the company are 31 toll stations, which furnish a great deal of business from the people in the less thickly settled districts. The rural line development also is extremely high, there being 357 subscribers in this class, of which 85 have been added during the past year. The contrast with the conditions prevailing amongst the Bell subscribers for this class of service is strong, as the latter company has only about 25 people connected to its three rural lines. The Independent company has added new lines more than twice as fast as the Bell. There are now in use 127 miles of toll lines, which enable connections to be established with the most important telephone companies in the vicinity, including the Phoenix Telephone Company, Rushford, Minn.; the Peoples Telephone Company, Chatfield, Minn.; LaCrosse Telephone Company, LaCrosse, Wis.; West Wisconsin Telephone Company, Arcadia, Wis.; Fountain City Telephone Company, Fountain City, Wis.; Plainview Telephone Company, Plainview, Minn., and the Tri-State T. & T. Company, which operates lines reaching all important cities for miles around. The officers of this company are: James A. Tawney, President; John Dietz, Vice President; Otto Troost, Jr., Secretary.

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Economical Telephone Accounting and Filing Systems

ARTICLE VII—CASH COLLECTIONS AND RECORDS.

*By Charles C. Wilmot, Telephone Accountant.

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CASH receipts in every telephone exchange should be handled by a thorough system which allows this branch of the work to be taken care of in the same way every day and every month of the year. It must be a uniform labor and time saving method. The plan described in this article has been tried

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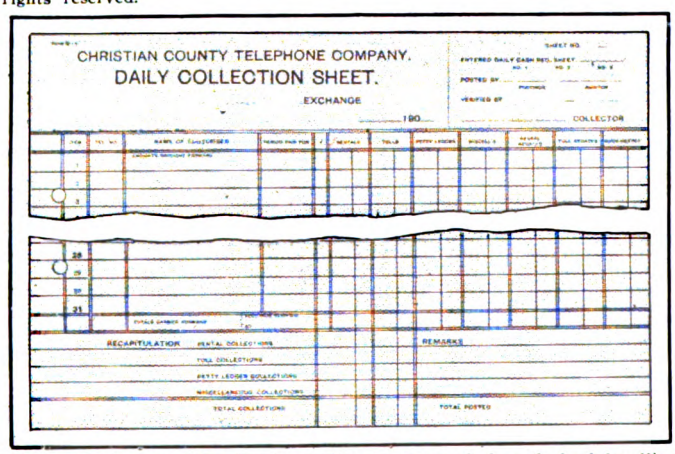
CHRISTIAN COUNTY TELEPHONE COMPANY.
DAILY COLLECTION SHEET.
EXCHANGE
COLLECTOR
RECAPITULATION
REMARKS

Fig. 1. This form (No. G-14) provides an economical method of handling connections each day.

and tested in different exchanges for a considerable period with most satisfactory results.

The daily collection sheet (Form No. G-14) (copyrighted), which is illustrated in Fig. 1, is 12x9⅜ inches in size, printed on inexpensive stock, and punched for a cheap loose leaf binder. spindle. These coupons are first sorted by telephone numbers or in alaphabetical order, according to the office arrangement used in keeping the subscriber's lease and toll ledgers.

The sheet is totaled and verified and should prove up with the cash. After they have been checked and found to agree both sheet and cash are turned over to the cashier so that the office receipts for the day can be entered in the cash book (See Form G-15 or G-15 c). These items are entered by totals only, the receipts for rentals, tolls, miscellaneous charges and suspense or delinquent accounts being kept in the petty ledger.

Columns are provided for the telephone number, name, period or bill paid for posting check, rentals, tolls, petty ledger and miscellaneous charges. Where rental or toll rebates have been allowed columns are provided for their entry. These rebate items of course must be "O. K'd." by some one in authority. After these totals have been entered by the cashier the sheet or sheets are numbered each day, always beginning with sheet 1, 2, etc. The sheet is then ready to turn over to the bookkeeper who posts directly to her ledger account of the subscriber. On the ledger account is entered a reference to the date and number of the sheet. The bookkeeper can use the column headed "Bookkeeper" for entering the total amount posted to each subscriber's account as a "proof check" of her daily work on each sheet, if desired.

The collectors enter all their daily collections on the same form and turn it in with their cash, rental and toll bill coupons, to the cashier. They make up their account of cash on the back of the sheet, so that the cashier can quickly verify the check turned in from this list. The coupons are checked with the sheet, to see that they agree with the entries made. At first thought this might seem to put considerable detail work on the collec-

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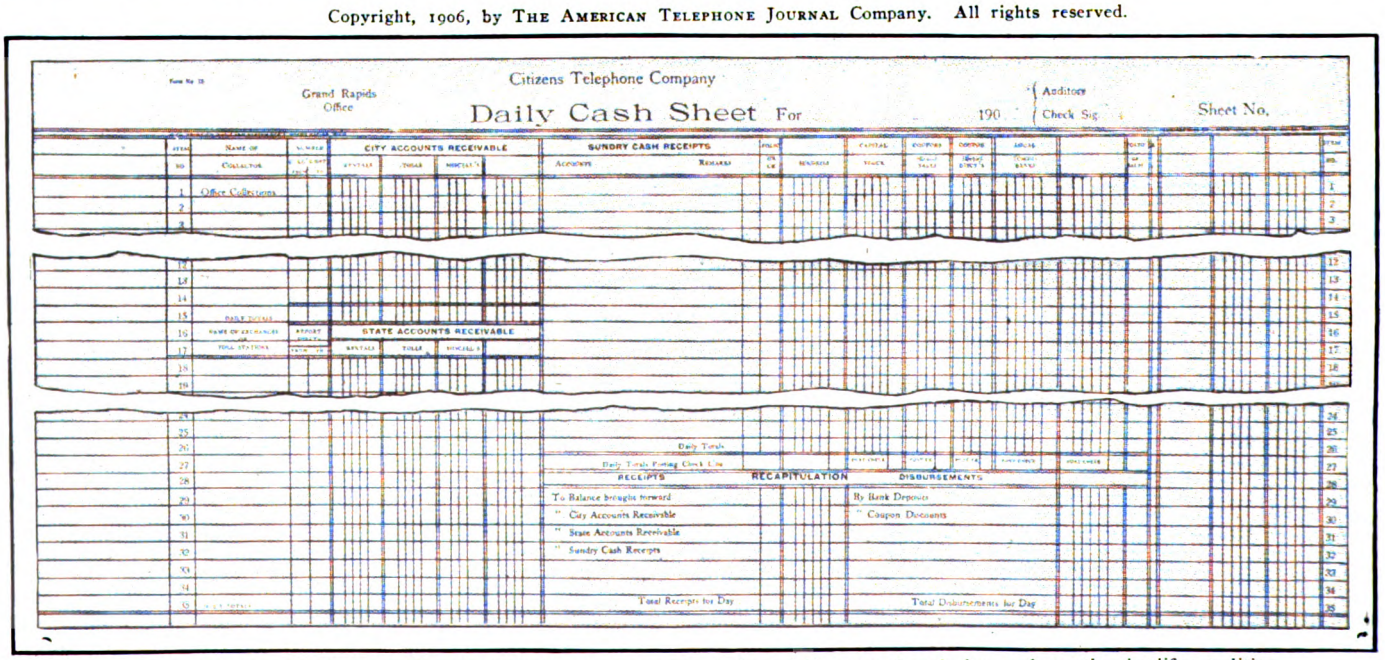
Citizens Telephone Company
Grand Rapids Office
Daily Cash Sheet For
Auditor
Check Sig.
Sheet No.
CITY ACCOUNTS RECEIVABLE
SUNDRY CASH RECEIPTS
STATE ACCOUNTS RECEIVABLE
RECAPITULATION
RECEIPTS
DISBURSEMENTS
To Balance brought forward
" City Accounts Receivable
" State Accounts Receivable
" Sundry Cash Receipts
By Bank Deposit
" Coupon Discounts
Total Receipts for Day
Total Disbursements for Day

Fig. 2. The use of this form (No. G-15) enables cash receipts to be quickly entered each day, and greatly simplifies auditing.

In handling office collections every payment made at the cash desk or received by mail for rental, toll or miscellaneous charges is entered on this form. The sheet is written up, either the last thing before closing or early the following morning, from the rental and toll bill coupons placed during the day on the cashier's

tors, but in most places it is found that very few collections are made after 4.30 P. M., and in actual practice it entails no hardship on the collectors. A decided advantage in this plan is that it inculcates habits of more careful and systematic work on the part of each employee in the collection department. Each sheet turned in is given a consecutive number for the day. If the office sheets number 1, 2, 3, and the first collector making a re-

* Editor's Note.—Mr. Wilmot is manager of the Telephone Systems Department of the Edwards & Hine Company, Grand Rapids, Mich.

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port hands in three more sheets they are numbered 4, 5, 6, and the totals entered in the cash book (Form No. G-15) with his name, and so on for each collector employed.

These sheets become the original itemized cash book for all

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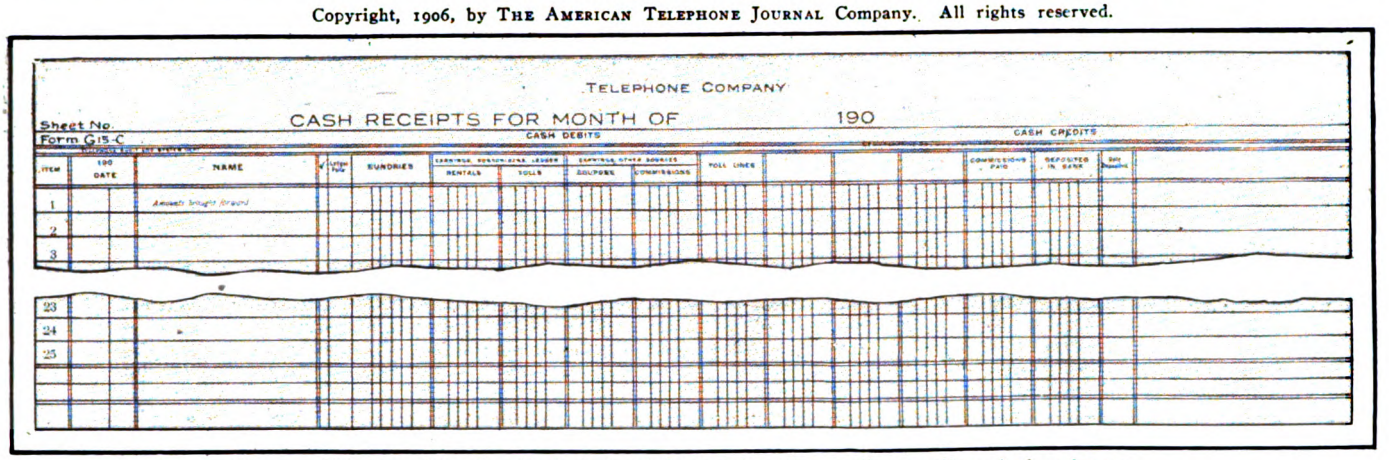

Fig. 3. This form (No. G-15-C) is designed for use in either small or medium sized exchanges.

subscribers' payments and collections. After the totals are entered and the cash book folio noted these sheets are turned over to the bookkeepers, whether there be one or ten employed, to be posted up. Every payment of the previous day can be posted by 11 A. M. the following day and the postings verified. The bookkeepers' initials or name are written in on each sheet handled and all are turned back to the cashier who arranges them in consecutive order, and files them away in a transfer binder with a cheap manila index sheet, cut a little wider than the form, between the group covering each day's work. The date in large figures appears on each index sheet. Immediate reference can be instantly made to any individual collector's sheet for any day's work. One very important feature of this plan is the ease and rapidity with which an audit can be made of the cash receipts of any large company. As each six months' or year's work is audited and verified and but little reference is made to these records, binders can be put away out of the dust in a very small space.

This form, No. G-14, is equally practical and desirable as a

article on "Forcing Collections," by Mr. F. V. Newman, which was published in THE AMERICAN TELEPHONE JOURNAL, issue of April 28, 1906.

The daily cash sheet, Form No. G-15 (copyrighted) has been in use for some time in a large general office having over eighty branch exchanges and many toll stations. It serves as a daily recapitulation sheet of all cash receipts (mainly made up from Form No. G-14) for the entire system. Each day's work is proved and the daily totals entered on a monthly recapitulation kept on the same form with the printing in the centre eliminated. The space headed "Sundry Cash Receipts" is used to enter all sundry cash receipts for capital stock sold, sale of coupon books, material, etc. This system is based upon the plan of depositing all cash receipts in the bank, making all disbursements by a voucher system and petty cash account. By this method the management can produce a voucher and check for every cent paid out. An audit of the cash receipts can be made mainly by the totals, and the disbursements quickly and correctly verified.

The use of Form No. G-15 C (copyrighted) for cash receipts and disbursements is largely self explanatory. It was designed for the use of small and medium size exchanges, either with or without the use of Form No. G-14 previously explained. It may

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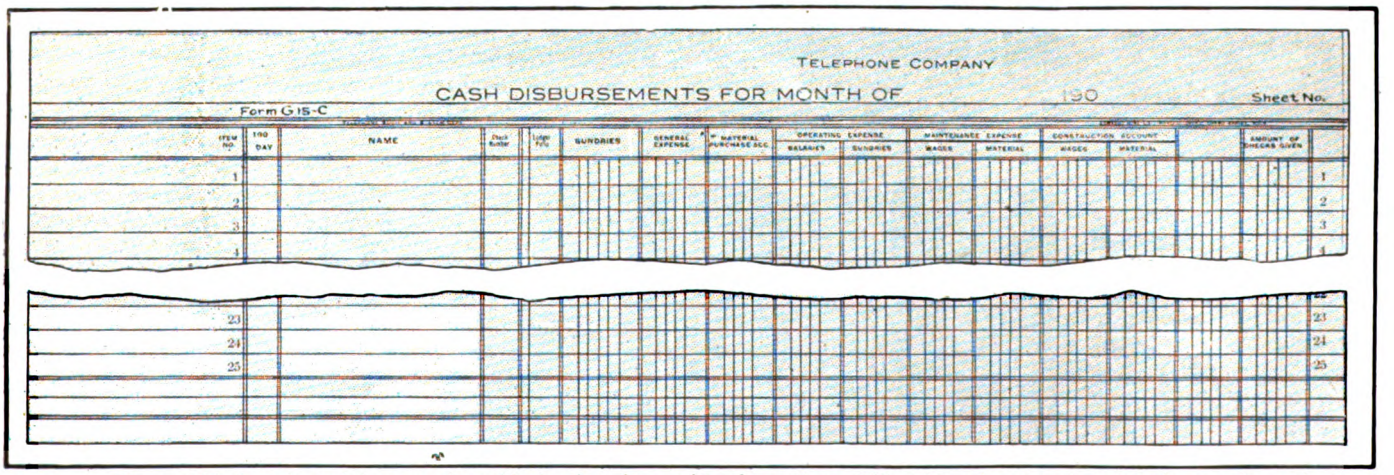

Fig. 4. This form is used in connection with the sheet for receipts shown above. Either loose leaves or bound books may be used.

branch exchange collection report to the general office, and especially so where the general office is keeping a duplicate set of records with each subscriber in its private branch exchanges. When used for this purpose the form is made in duplicate, by inserting a carbon sheet. The original is mailed to the general office, the carbon copy serving the purpose of the branch exchange cash book, from which the people in charge post to their own local records.

In connection with the work of every telephone collection department especial attention should be given to the very able

be arranged either as the debit or credit side of a regular bound cash books and check register or as two separate loose-leaf or bound records.

The form as illustrated is designed to be used where all cash receipts are deposited in the bank, but can be used without changes for disbursing payments by either cash or check if desired.

Blank columns are inserted which can be used either for debits or credits. The printed headings on columns can be changed to suit the varying needs introduced by different local conditions.

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Cable Laying on the Thames

By John Putnam.

Illustrations from Photographs by the Author.

If the reader will take a map of Connecticut and look carefully at its southern boundary, which is Long Island Sound, he will notice numerous indentations of the coast formed by inlets, harbors, creeks and rivers. Some of the rivers are very wide and run well up into the state.

Along the shore are cities of considerable importance, which have large populations. Telephonically these cities are well developed, and their business interests intertwine so closely that a vast network of toll lines connects them with each other and with their more northerly neighbors. To get these toll lines from town to town requires the frequent crossing of rivers too wide to span, so recourse is had to some type of submarine cable. This article purposes to describe such a cable and the usual method adopted in putting one down.

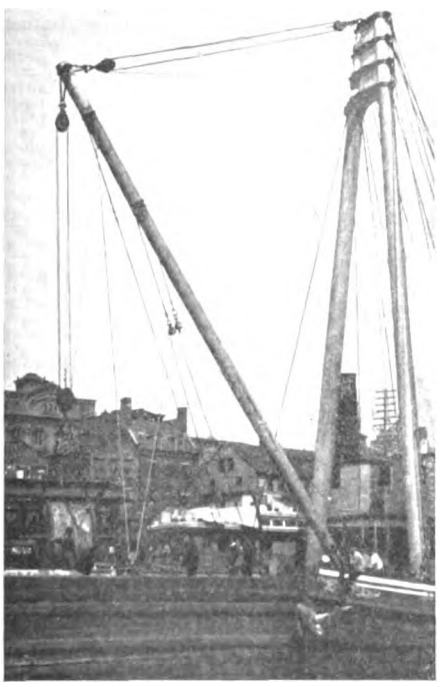

Fig. 1. The transfer from car to lighter.

The cable chosen as an example was recently laid by the Southern New England Telephone Company across the Thames River at New London, Conn. Figure 1 shows the cable being lifted from a flat car, by means of a powerful derrick, to the deck of a lighter, where it is placed on blocking which raises it clear of the deck. Although the company has laid much longer cable, this is one of the heaviest it has ever handled. In this case the derrick had to lift 18,000 pounds, or nine tons. As the week before, however, it had handled a twenty-five ton boiler, and as it has a lifting capacity of thirty tons, the nine ton reel of cable was easily set in place.

Let us take a closer look at the cable, as shown by Figure 2. By comparison with the size of the men, it can be seen that it is of no small proportions. Through the center of the reel is passed a steel shaft, each end of which rests upon blocking built up by timbers.

The cable is 1,450 feet long, weighs 18,000 pounds and is composed of 100 pairs of No. 19 gauge B. & S. conductors. These conductors are coated with an enamel covering to a thickness of three to five ten-thousandths of an inch. This is in order to increase the dielectric strength of the insulation, the idea being that lightning or other high voltage currents will not as readily jump from one conductor to another, as they would if the insulation consisted only of paper. Over the enamel covering there are two wrappings of paper wound in opposite directions. The conductors are of copper of a specified purity, and are twisted in pairs with the lay not exceeding three inches. They are then laid up in a cylindrical coil in reversed layers, and the coil is covered with two wrappings of paper. Outside of the coil of wires is a lead sheath 5-32nds of an inch in thickness, the lead being alloyed with tin to not less than three per cent. Over this lead sheath are three layers of jute, wound in reverse directions. Outside of these is an armor of iron wire, No. 4, B. W. G., diameter .238 inches. The lay of this armor is not less than twenty, nor more than twenty-four inches. Over the armor are two wrappings of hemp, laid on in reverse directions. This hemp is saturated with a preservative compound, consisting of 65 parts of mineral pitch, 20 parts of fine sand and 5 parts of tar. The cable is then covered with whitewash, or similar material, to prevent its separate coils from sticking together and to the reel. The armored wire is galvanized according to standard specifications. The completed cable measured 9½ inches in circumference.

Fig. 2. Mounting the reel on blocks.

As to its electrical properties, the No. 19 gauge conductor has a resistance of not more than 45 ohms per mile at 68 degrees Fahrenheit. Its insulation resistance is not less than 500 megohms per mile, the insulation of each conductor being measured with an electromotive force of 500 to 550 volts against all the rest of the conductors and the sheath.

In Figure 3 all is in readiness to start up the river to the point where the cable is to be laid. At the right of the picture can be seen the motive power of the lighter, a powerful sea-going tug. At first glance this may appear an expensive outfit to hire for this work, but when it is understood that there is $2,000 in-

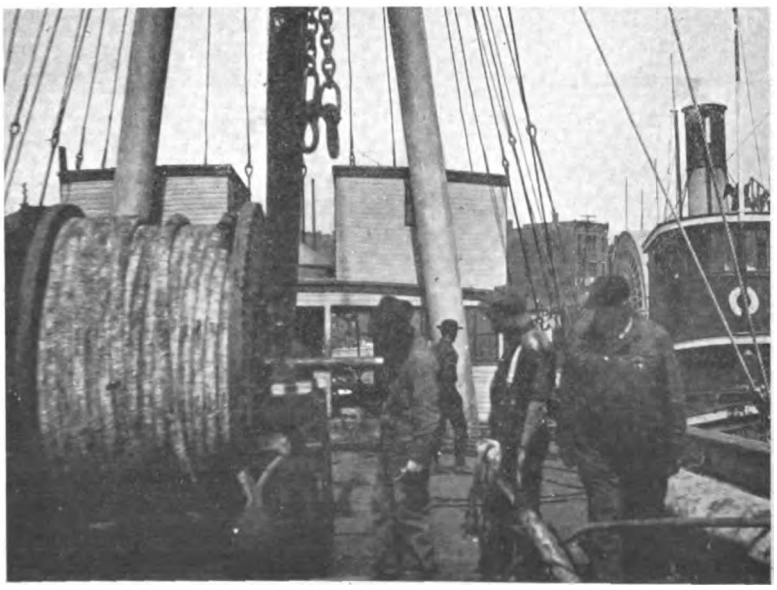

Fig. 3. Ready to take the cable up stream.

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vested in the reel of cable at the left, and that it is bought to fit the Thames River at a certain point, with only sufficient slack to go into the cable houses, the comparative cost of a wrecking lighter and tug for a few hours does not appear so large.

This cable was laid at a point about a mile up the river, just south of the Railroad Bridge, a locality made famous as being near the finish line of the annual Harvard-Yale boat race. Figure 4 shows the west bank of the river, and is the start of our cable-laying journey. If the reader will look closely at the picture the cable can be seen running from the water's edge up the beach to the cable pole. The landing of the shore end is an interesting operation to watch. The men take the end of a rope ashore, pass it through a snatch block that is fastened to the butt of a telephone pole, and bringing it back on the boat, firmly fasten it to the end of the cable. The other end of the rope is then passed around the drum of one of the steam winches, which, when started, begins to pull the rope aboard and the cable ashore.

Fig. 6. The improvised brake at the stern.

The cable house will be noticed over at the left of the picture, on the pole near the abutment of the bridge. After a sufficient length of cable has been taken ashore all is in readiness for the short journey across the river.

The captain has ordered the tugboat pilot to keep as near to the bridge as possible, and the trip to the opposite bank begins. In Figure 5 the middle of the river has been reached, as can be seen by the position of the draw part of the bridge, the draw tender's house just coming into view at the right of the picture. The men on either side of the reel are bearing against its periphery with levers of plank. This acts as a brake to prevent the cable from unreeling too rapidly. It can readily be seen that it must be under some tension, or the current might wash it down the river, the shortest distance across would not be made, and as the cable is just long enough, it would fall short of reaching its destination. If the reader will look closely at Figure 5, it will be noticed that two courses, or layers, of the cable have been unreeled, as the marks on the inside of the flanges of the reel plainly show.

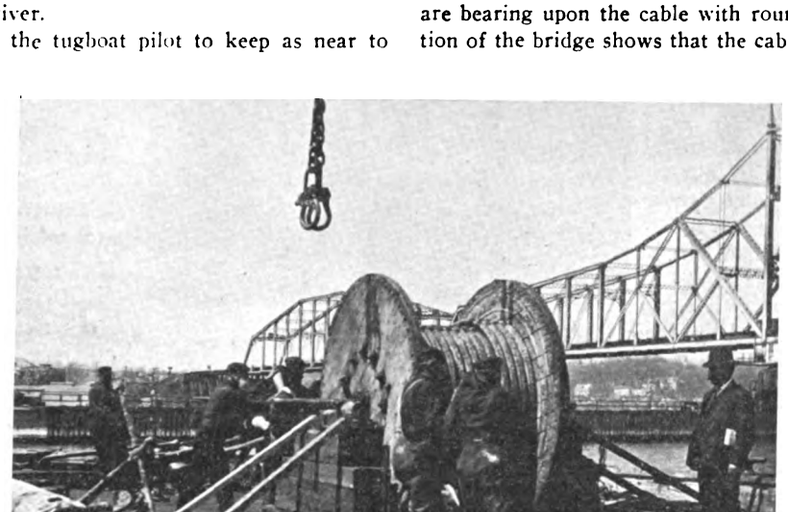


Fig. 5. Cable running off the reel, in midstream.

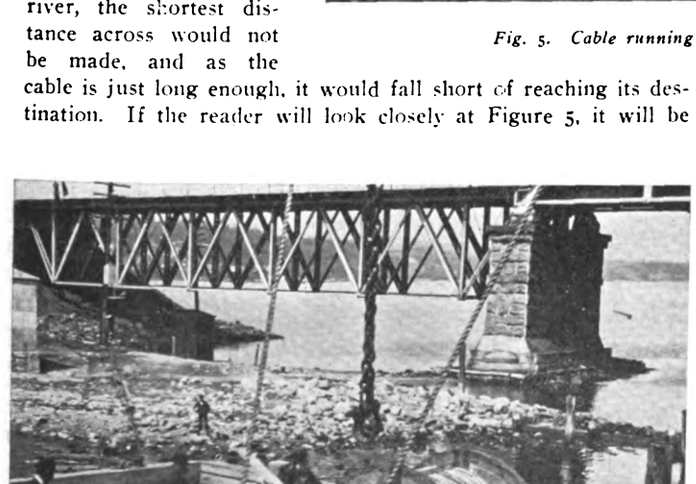
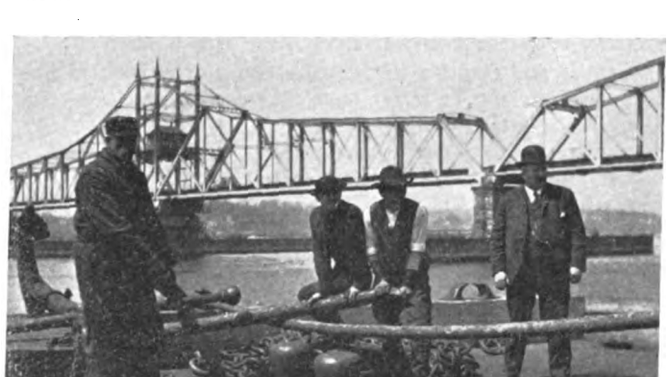


Fig. 4. Starting from the west bank of the Thames.



Another style of brake is shown in Figure 6, in which the crew are bearing upon the cable with round wooden levers. The position of the bridge shows that the cable has progressed still farther towards its destination, as the draw tender's house is now at the left of the picture.

Soon the lighter bumps on the east shore of the Thames River, the last forty or fifty feet of cable are uncoiled from the reel and laid upon the deck, the men get into the rowboat with the cable end and go ashore with it. In Figure 7 they can be seen carrying it up the beach. Then the same hitch up with a snatch block, a rope, and the donkey engine on the lighter, as previously described, is made, and the slack is pulled out and farther ashore.

Captain Goodale, of the T. A. Scott Wrecking Company, has handled the laying of many cables for the Telephone Company, so his first question at the end of the journey was, "How long did it take." "Eight and one-half minutes," came the reply. "Huh, we ought to have done it quicker than that." Notwithstanding the Captain's opinion, however, the cable was laid quickly enough, and the whole operation was conducted with a smoothness and foresight that spoke volumes for the ability of the Construction Department of the Southern New England Telephone Company. To sum up the work, it might be said that the expected always happened, the unexpected, never. The telephone lines seen in Figure 7 carry the toll lines to Westerly and Providence, R. I.

The journey back to the dock is without incident, and in Figure 8 the empty reel may be seen being lifted back onto the flat car for shipment to the manufacturers. At the left of the picture, the blocking between which the cable rested shows particularly well as the reel is hoisted out of the way. "Tell them not to make the cables any bigger," were the parting words of the Captain, it being evidently his opinion that this cable had been plenty large enough for convenient handling.

Such is the usual method of laying submarine cables across

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rivers. About it there has seemed little to tell without being verbose, for the pictures tell the story better than the text, and a careful study of them will be well repaid. The excuse for describing so seemingly simple an operation is that there are probably telephone men who have never seen it done. In Colorado it is said they lay submarine cables on the land, in order that the wires may be secure from the interference of land or snow slides. It may interest readers in that part of the country to read how in the East such cables are laid in the water. Sometimes, however, unusual means of laying these cables are rendered necessary, and in a succeeding number of this journal the laying of a submarine cable with the help of a locomotive will be illustrated and described.

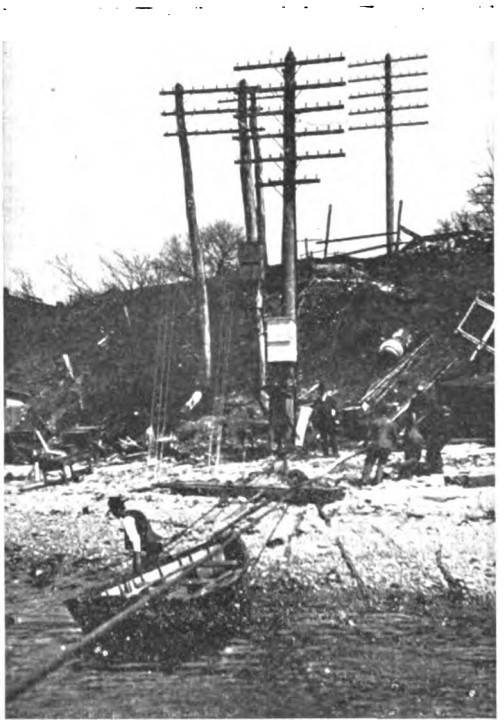

Fig. 7. Taking the cable ashore on the east bank of the Thames River.

TELEPHONE THE GREATEST MEDIUM FOR DISTRIBUTING INFORMATION.

NEWS GIVING over telephone lines is growing in extent and in many parts of the country is superseding all other methods of communication where promptness is required.

An excellent example of the advantages of this plan was recently furnished the people of Massachusetts on the occasion of the promulgation of the appeal of Governor Curtis Guild for contributions to the sufferers by the earthquake in California.

This letter of the governor was read at a meeting of the relief committee and given to the telephone company at five o'clock in the afternoon and by eleven o'clock in the evening it had been dictated over the telephone and copied by the mayor, as the chairman of the board of selectmen, or his representative, in every one of the 356 cities, towns, villages and hamlets in Massachusetts except two, one being a mountain village in the Berkshires and the other a fishing hamlet on the island of Martha's Vineyard.

The letter was also given to the editorial office of every newspaper in Massachusetts during the same time.

This information reached the cities and larger towns in time to provide for calling special meetings of citizens and to be read before audiences already gathered together at theatres, concerts and other entertainments, enabling thousands to give twice by giving quickly.

In ancient times the most rapid method of communication over anything approaching so considerable a territory is said to have been by the kindling of signal fires upon the hilltops. The contrast with this primitive method is hardly greater than that which exists to-day between the use of the telephone, which enables all desired information to be given to millions of people almost on the instant and that of other systems of transmitting intelligence which are being so rapidly superseded.

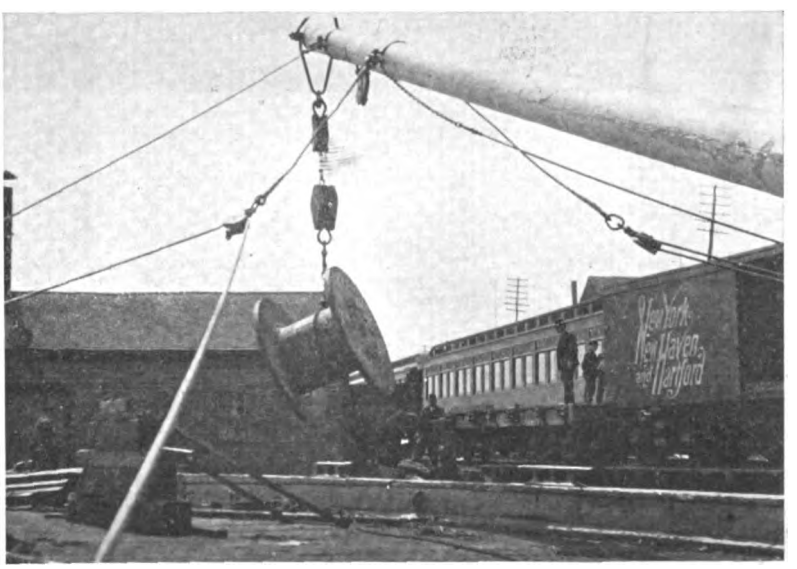

Fig. 8. The last operation; swinging the empty reel aboard the car after the cable has been laid across the river.

CENSUS BULLETIN ON TELEPHONES AND TELEGRAPHS.

THE condition of the telephone industry in 1902, as shown by figures collected by the Census Bureau, is indicated in a special report which the Government has recently issued. The report includes the statistics which were made public in a bulletin issued a considerable time ago, but much additional material has been introduced in the way of general historical and descriptive matter prepared by Mr. Thomas Commerford Martin, who has acted as expert special agent for the department. This matter has been so chosen and arranged as to give a rather comprehensive summary of the progress and present state of the art and should be an important agent in promoting the growth of a knowledge of the importance of the industry.

The report contains statistics concerning the physical equipment, service and financial operation of different classes of telephone systems. So rapid, however, has been the progress of the industry since the collection of these figures that not only on account of the increase, but on account of the change of proportions which has accompanied this increase the figures concerning development possess little more than historical interest.

THE POWER OF SLANG.

THAT a change of telephone numbers is a bad thing is agreed, but a well known official of one of our largest companies recently decided that in his case its inconvenience was well worth enduring. As the story is told in the town where he lives, Gen. ——'s number used to be 23, and the general who disagrees with Brander Matthews that slang is condensed metaphor, felt that as treasurer of the company which owned the wires, he could keep on having 23 for his number if he chose to do so.

Night after night from his friends would come call on the heels of call.

"Is this 23?"

"Yes."

"Not really? Well, skidoo for yours."

Being anti-slang the —— household could not fall back on profanity, which is the ruffianly relation of slang. It could only go back to bed and consider.

The last straw was the following:

"Is this 23?"

"Yes."

"May I speak with Mr. Skidoo?"

"There is no such per son here; this is Gen. ——'s residence. Mrs. —— is speaking."

"Oh! Mrs. Skidoo. Then how are Mr. Skidoo and all the little Skidoos? What, no Skidoos, you say? How curious!"

Then the General rushed out and closed the conversation.

But in the morning he changed his number, and no one else has applied for it to date.

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An Automatic Monitor

By John Grant.

INDEPENDENT companies must derive their greatest strength from the furnishing of a service superior to that which is given by their competitors. There are two important elements which contribute to the maintenance of such a service. The first is the requirement of well designed and constructed switchboard and outside plant. With the necessary amount of money at hand there can be obtained a switchboard, lines, and instruments which are capable of being handled in such a way as to give results which conform to or even surpass the highest standards of our competitors. A normal amount of effort and expense serves to keep these appliances in such condition that they will continue for years to give the same results as at the time of installation. These may be considered as established standards, imposing limitations, it is true, but of such a nature that improvement by the removal of these natural or physical causes which determine them are in the province of the inventor.

The manager of a telephone exchange is concerned with efforts to make the handling of calls with the apparatus at his disposal as efficient as possible. It is service that he has to sell and this is the commodity to the improvement of which his work should lead. This means that among other things he must constantly endeavor to have his operators manipulate their switchboard apparatus in such a manner as to complete each call without inaccuracies and with the minimum delay. What is more costly than a poorly manipulated switchboard? This is the cause of the loss of nearly all subscribers who discontinue their contracts, and of the failure to receive toll business with the constant increase at once of earnings and prestige to the Independent company. The friendship and confidence of subscribers, on the other hand, when secured by giving the most valuable service attainable, is an extremely useful aid to the securing of new business. Our operators, therefore, must be taught to educate the public to demand the best service, and to give such attention to their work that this service may be furnished constantly, without a break which may be taken as a cause of complaint.

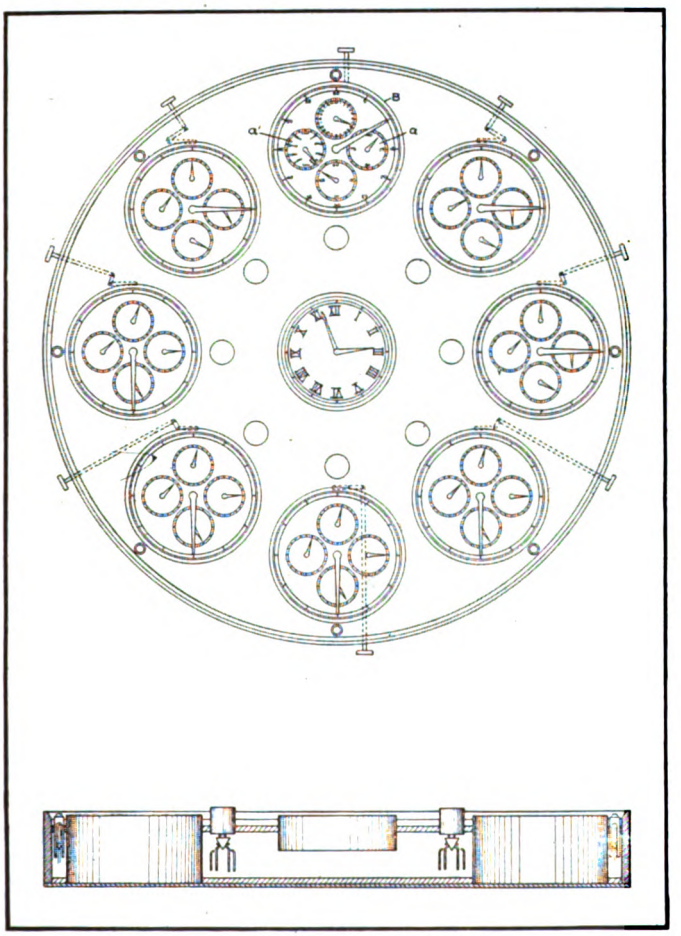

Fig. 1. Front and sectional view of complete "automatic monitor" for eight-position switchboard.

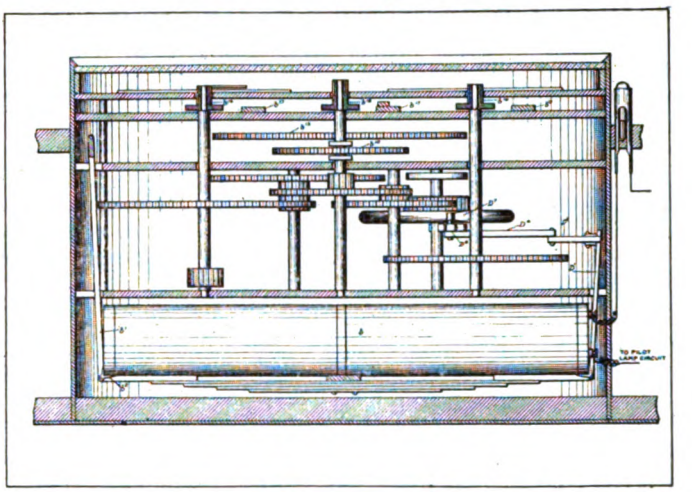

Fig. 2. A sectional view showing apparatus for moving indicators. The remainder of gearing is shown in Fig. 3, page 419.

The local operator should be intelligent, accurate and courteous. One with these qualities can be trained in the requirements of her work until she is capable of securing the best results. Experience has demonstrated the nature of these results, and established standards which are to a large extent agreed upon. In the methods of securing them however, the greatest divergence of practice exists. Various plans for obtaining knowledge of the grade of service which are actually given have been devised. Tests are made, and with the information obtained from them the manager is able to discover the amount of improvement necessary. Stimulation of interest, and where necessary, measures of discipline are resorted to in order to spur the operators to more constant efforts.

It is evident that whatever method of checking the work of the operator is resorted to should, for the attainment of the highest objects, be economical in operation, give a check not merely on a percentage of calls but upon all connections which are made, and be absolutely accurate. It is desirable that any difficulties in the service should be detected at the time they occur. Correction of the operator at fault is thus possible at the time when it will be most useful.

With these scientific requirements admitted it is a logical deduction that proper automatic apparatus, located under the observation of the manager or a competent chief operator affords an ideal check on the work at the switchboard. Such an apparatus should record for each position at the switchboard the number of calls, and enable any irregularity in a single call to be instantly detected by the person in charge of the service.

E. K. Hertford, now manager of the Charleston Home Telephone Company, of Charleston, W. Va., became impressed some time ago with the necessity for such apparatus. Eager to give his own subscribers the best returns for their payments, and aware of the benefit which might be obtained by his associates, he has invented an instrument, in connection with a system of application, which has enabled him to secure a constant and accurate knowledge of the work done by his force of operators. In this apparatus there is provided for each switchboard position a set of dials upon which is registered by means of electromagnetically controlled recording mechanisms, the total number

(Continued on page 418.)

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THE EDITOR'S PAGE

PROGRESS BETWEEN CONVENTIONS.

DELEGATES to the Chicago convention next week may congratulate themselves on having completed a year of great achievement since the last annual meeting. Much has been done for the promotion of the success of the Independent companies through the efforts of the National-Interstate Association. Within the year we have seen established a number of new State organizations, and existing branches have extended their influence and systematized their efforts until they have arrived at a point where, almost without exception, each company represented feels and acknowledges the value of their work.

The spirit of the central organization has spread over the entire country, and all Independent men are now working together with a common object. With the slogan, "Look for the Shield," as a rallying phrase all officials and managers are carrying on the great fight with all the confidence which comes from the knowledge that they are receiving the earnest support of their associates. No longer has anyone the feeling that he is carrying on a hard struggle alone against desperate odds; each realizes that he is joined with his friends in making the success of a tremendous enterprise, and that his efforts are known and appreciated.

The gathering of classified information concerning operating companies by the officers of the association has gone far enough to be definitely useful in many ways. For one thing, it has resulted in enabling many operating companies to put their toll line work on a firmer foundation. Only a short time will elapse before the advantages of this will become evident in financial returns.

Then there is the matter of adding new members, which affects the old supporters in a double sense. Every additional town which contains an Independent system adds just so much to the value of plants in those places with which it connects. Many operating companies have been approached with proposals to join the Bell system, but through the untiring watchfulness of the officials of the association and the assistance of men in the localities affected, the convincing knowledge of the advantages they will gain by retaining their independence has been lacking to few indeed of these wavering individuals.

The standing committees of the Association have made a good start on the work in which they are engaged. This is so important that no haphazard statements must be issued before the committees are sure of their ground. There can be no jumping at conclusions on their part; when they make an announcement it must be one which they feel sure is right. So, at best, the most that can be expected now is a statement of the course taken by their investigations, of the rough form of results which may be looked for, and definite plans for the future. Next year, however, the work of these committees should go far enough to permit the issuing of reports which can be used to bring about improvements in the methods of handling work now in use by many companies.

One of the most useful influences exerted by the association has resulted in a widely increased public knowledge of the meaning of Independent service. The space devoted to Independent progress by the daily press is increasing, and, in spite of the contrary reports, all remarkably similar, which are circulated with so much diligence, people throughout the country are coming to realize very thoroughly that most Independent companies are sound business enterprises and give good service.

One thing taken up by the Association has resulted in much general good, but is nevertheless criticized unfavorably by some careful members. This is the conducting of a supply department. Its value in promoting the introduction of emblems which have assisted to a remarkable extent in building up the feeling of enthusiastic co-operation and have had a definite advertising worth, is positive and unquestionable. Many feel, however, that it is unjustifiable to use the efforts of the able men who are charged with the direction of the Association's policy and affairs in conducting a business enterprise for profit. It is pointed out that the competition of the Association with any of the private organizations contributing to the development of any branch of the telephone business is hardly advisable, and may ultimately lead to unpleasant complications. The connection of the Association with the supply business would not be open to these objections if it were confined strictly to an establishment of just and uniform standards. But once the standards are fixed the Association should not attempt to enter the field of the regular manufacturing and supply houses. There is work enough for it in settling on standards and strengthening the organization, and there is danger that more important things may be sidetracked if profit making is attempted.

LOOK FOR THE SHIELD!

The Association can show results, and all the operating companies should be willing to pay toward its support an amount definitely proportioned to the benefit they receive. It is to be hoped that an adequate means by which the distribution and collection of the entire necessary expenses of carrying on the work of the Association may be assured without a waste of the energy of some of the best men in the field will be agreed upon at this convention.

Everyone realizes that this has been a big year. Growth has been tremendous, and managers feel happy and confident. The officers of the Association look for still more rapid progress in the future, and ways in which it may be made still more useful to its members will be made clear. It is for the members at the convention to help complete projects in which the whole body may join, unite in deciding on the best ways to push them, and above all, to get to know one another—to get together—for the pace next year will be fast.

SYSTEM IN TELEPHONE EXCHANGE MANAGEMENT.

LITTLE can be accomplished in an enterprise where the head attempts to do all the work himself. Details of the daily routine must be taken care of as they come up, and a careful supervision of each process will so occupy the time and dissipate the energies of a high managing officer that the duties for the performance of which by his superior ability and experience he is peculiarly fitted must perforce be neglected.

The ideal condition for which most telephone managers are striving will permit them to know when a piece of routine work has been started and completed, and in case of an emergency allow the state of its progress to be determined very quickly by reference to a proper record kept within the office.

Furthermore it is desirable that the method of carrying out each kind of work should be such as to insure uniformity and correctness through proper checking, not merely of records, which is, after all, of secondary importance in spite of its very real necessity, but of the work itself.

The article by R. M. Eaton, begun in this issue, describes the methods which he has built up for handling the work of the Independent company at Niagara Falls. The exceptional success which has been made by his company gives to this article the highest value as an exposition of thoroughly practical methods.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

CHARACTER AND SITUS OF COMPANY FOR TAXATION.

Will you give us the space in your valuable department to answer the following questions:

1. Our company is incorporated (in Pennsylvania) under the act and its amendment providing for the incorporation of telegraph companies, although we do a telephone business. Are we to be taxed under the revenue laws as a telegraph or as a telephone company? We do no telegraph business.

2. The property of the company is owned and its business is carried on partly within and partly without the State. Can our capital stock be taxed in both States? R. C. D.

ANSWERING your questions in order the Editor will say, first, that the act under which you are incorporated determines your character for purposes of taxation. You are therefore liable to be taxed as a telegraph company under Revenue Act June 7, 1879.

As to the place of taxation, a ratable proportion only of your capital stock can be taxed in each State. See Commonwealth v. W. U. Tel. Co., 2 Dauph. Co. Rep. 30.

UNIFORMITY OF TAXATION.

Where the State constitution requires a uniform rule in levying taxes and the statutes provide that the rate for telephone and telegraph companies shall be the average of all taxes raised for all purposes, local as well as State in the commonwealth, is the law enforcible? J. C. W.

SUCH a tax law was held unconstitutional in Michigan where the taxes assessed for the State bore a proportion to the amount to be raised and all property was charged with a common and equal percentage upon its assessed value. Pingree v. Auf. Gen. 78 N. W. 1025. 44 L. R. A. 679.

CITY CANNOT BY CONTRACT DIVEST ITSELF OF POLICE POWER.

The city entered into an agreement when it granted us a license to do business that we should not have to renew our poles or wires except at our discretion. This was made part of the ordinance and in consideration therefor we furnished the city with free telephones in the city hall and each of the fire department stations. Now the common council asks us to replace some of our old poles with new ones on the ground that they are in danger of falling. This is not the case at all, but what we wish to know is whether the city can make us do this in the face of the clause in the ordinance granting us our discretion in keeping our line in repair. A. E. A.

THE city had no authority to enact the clause in question. The State law delegates to the city authority to regulate the use of streets and alleys by telephone and telegraph companies. Of this authority the city cannot divest itself by contract or in any other way. It can therefore compel the replacing of poles or wires when necessary. By showing that the poles are not in danger of falling you might legally resist the enforcement of the new ordinance.

HOUSE MOVER'S LICENSE ENTITLES HIM TO CUT WIRES IN MILWAUKEE.

HOLDING that under the city ordinance of Milwaukee the Wisconsin Telephone Company has no right to maintain its poles and wires in their present condition, but should have them under ground, Judge Tarrant has dissolved the injunction, secured by the company, restraining August Bartz from moving a house across the intersection of Twenty-fifth and Cherry streets. The company obtained the injunction on the ground that the operations of Mr. Bartz would require the cutting of five of its cables and eight wires. It was alleged these wires and cables supplied some 1,100 telephone users in the northwest side of the city.

Judge Tarrant's decision follows in part:

It is the decision of the court that the defendant, being in possession of a valid license from the city of Milwaukee, has a right to move the house along the streets in question—that is, pursuing the conduct which the defendant pursued, notifying the plaintiff of his intention to move, and that the plaintiff is not entitled to the injunction restraining the defendant from so moving upon the showing in this case.

It appears, as I understand it, although the question was not argued except as it appears in affidavits and briefs, that under an ordinance of the city of Milwaukee the plaintiff was required to lay underground wires and conduits and has no authority to maintain its poles in their present condition, and upon that showing it was the right of the defendant under its license to move the house in question without obstruction. This is no permission to the defendant wilfully to destroy the wires, but notice may be served on plaintiff of this decision.

Some point was made that the ordinance in question is unconstitutional, but the court would certainly not feel warranted in so holding under the present showing.

The ordinance referred to was passed October 19, 1891, and requires that on certain specified streets and on "such other streets as the public interest may require," the wires of the telephone company must be placed in underground conduits.

GEORGIA COMPANY PUTS ITSELF UNDER STATE RAILROAD COMMISSION.

THE first application of a telephone company to place itself under the jurisdiction of the Georgia State Railroad Commission established by act of the last session of the legislature was made recently when the Denton Telephone Company of Willacoochee, Goffee county, filed its consent with the board. The application was promptly granted and in future the company will have its rates regulated by the State Commission.

Under the law, companies operating under jurisdiction of the board have the right to condemn rights of way through which they desire to construct their lines; the compensation to be paid to the property owners is to be fixed by a board of arbitration.

MAYOR OF PENNSYLVANIA CITY VETOES FRANCHISES TO PRESERVE POLE TAX.

MAYOR McCALL of York, Pa., has vetoed bills granting to the York Telephone Company and the Pennsylvania Company the right to construct and maintain conduits in the city. The bills had passed both branches of councils.

In returning the bills without his approval Mayor McCall gave various reasons, principal among them being that to grant the privileges would take away the revenue coming from pole tax without substituting any other method of immediate return to the city; also that the ordinance as constructed does not specify streets that may be occupied, thus giving unlimited rights over all streets and alleys. Other parts of the ordinance are found defective.

TEXAS TELEPHONE COMPANIES EXEMPT FROM INTANGIBLE TAX LAW.

OWING to the word "telegraph" being attached to the corporate name of the Southwestern Telegraph and Telephone Company, Tax Commissioner Davies, of Texas, asked the attorney-general if the company came within the provisions of the Williams intangible tax law.

The attorney-general has advised him that it does not, as the company is not engaged in a general telegraph business for profit, merely having private telegraph lines between its offices for personal use. Telephone companies are specifically omitted from the provisions of the law.

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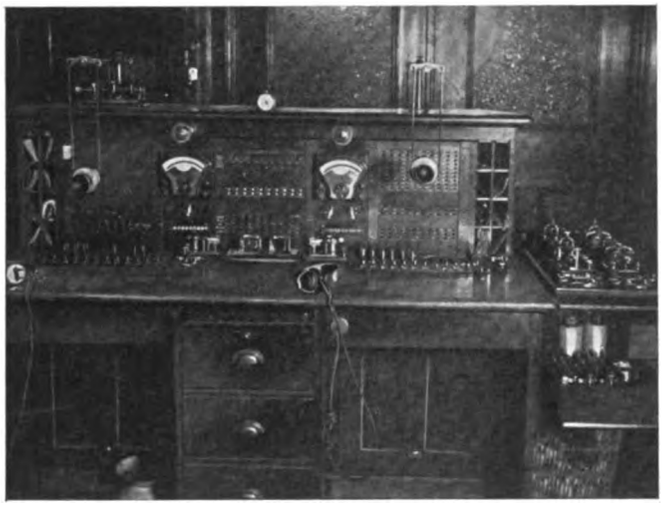
The Importance of Efficient Testing Apparatus

By Louis Mühlheizler.

WE all know that the battery gives the energy of the telephone plant. Whether it is at the instrument or central office, it must be maintained in first-class condition to obtain good transmission, efficiency and also to obtain good working conditions of relays and other signaling apparatus. This is the first important feature of the telephone plant.

The second important feature of the telephone plant is efficient testing apparatus. This is a very vital point and worthy of due consideration in every telephone exchange. No matter what size the exchange may be, it should be equipped with the best testing apparatus obtainable and have men in charge who are capable of so handling it as to obtain results. Efficient testing apparatus is economical for the reason when tests are made it will show



Testing Set Used in the Pittsburg Exchange of the Pittsburg and Allegheny Telephone Company, of which Mr. Mühlheizler is Superintendent of Maintenance.

whether the trouble is in the switchboard, line, telephone or cable head. When the nature of the trouble is ascertained, the troubleman is sent to the place where the trouble really exists and it is cleared in a very short time.

In a large telephone exchange considerable trouble arises daily owing to natural causes. This must be handled with intelligence, or, in other words, "good horse sense." With the right kind of testing apparatus and a competent wire chief to test and handle the trouble there is no reason why there should be any trouble carried over at the close of each day, excepting when storms cause exceptional damages. When the trouble is handled with speed and accuracy it reduces the cost of maintenance for the reason that it does not require so many troublemen to take care of the plant.

An essential feature which must be provided for in the testing apparatus is the location of toll line trouble. When trouble is properly tested and located on toll lines it can be cleared in a very short time, reducing the cost of time, railroad fare and livery hire to a considerable extent.

It will be surprising to note that in some of our modern telephone plants throughout the country trouble is handled without any system whatever. The chief operator reports to the wire chief the telephone of John Smith in trouble. The wire chief notes the ticket, looks wise, does not make any test, but wakes up the troubleman, who is sitting on a chair with his feet on the manager's desk.

"Say, Jim, John Smith's telephone is in trouble again. Suppose you go out and see what the trouble is." Jim, of course, complies, goes to the subscriber's station or place of business, calls up the operator and requests her to ring the bell. This ends the inspection and Jim goes back to the office again without calling the wire chief to test. The wire chief inquires what trouble he found and Jim says: "Oh, nothing; Smith does not know what he is kicking about." The chances are that this exchange has no testing apparatus except something of a very crude form. The consequence is that the subscriber gets tired reporting his telephone and orders the company to take it out. The telephone company probably not only loses a good subscriber but considerable toll business, all on account of inefficient testing apparatus and lack of intelligence.

For the handling of trouble in the larger exchange districts, say plants of five thousand capacity, the troublemen should be divided up into districts and each case of trouble tested out before sending a troubleman. Each troubleman should remain in his particular district, clearing trouble and reporting from each telephone to the wire chief as the line is cleared.

The wire chief will at once ascertain whether the line and telephone are in good working order. The troubleman then proceeds to the next case of trouble and so on until all trouble is cleared. He remains in his district and keeps in touch with the wire chief by telephone. The troubleman is not authorized to return to the exchange unless ordered to do so. There are also cases where one troubleman has more trouble in his district than he can take care of and another troubleman who is not so busy in his district can help out without returning to the office. In this way things are kept running smoothly, since the men are controlled by an employee who has a means of determining the exact conditions existing on his lines.

AN AUTOMATIC MONITOR.

By John Grant.

(*Continued from page* 415.)

of calls answered, timing each from the second or fraction thereof each call is received at the switchboard until the operator has answered the subscriber. In connection with each set of dials a duplicate pilot lamp is mounted and so connected as to be illuminated at the time the call is received at the switchboard, and a switch is so arranged that the chief operator may, at will, listen to the conversation carried on by the operator by the connection of her receiver in multiple with the tertiary winding of the operator's induction coil.

The mechanism by means of which these objects are accomplished is ingenious, and comparatively simple. In Fig. 1 is shown a view of a typical outfit which contains within a single

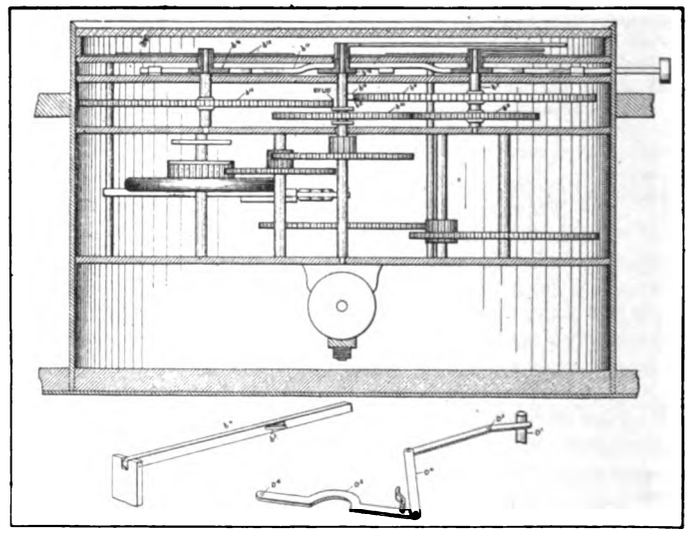


Fig. 3. View of recording apparatus in section approximately at right angle to that of Fig. 2. Details of call actuating device and timing controller.

circular case the apparatus for obtaining simultaneous records on eight separate local operators' positions. In the centre is an ordinary clock which indicates the time of day. This is useful as a means of checking records of individual calls possessing extraordinary features which may be noted at the time such calls are made. Surrounding the dials of this clock are the dials as-

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sociated with the eight sets of recording mechanism. Referring to the dial B, it is to be noted that the periphery is divided into 60 divisions, each of which represents one second. Of the dials within this the lower is graduated in 60 divisions, each of which represents one minute, and the upper has 24 divisions, each representing one hour. Suitable hands are provided for moving over the faces of these dials to indicate the elapsed time. The function of the other two dials is to register the number of calls received at a position. The right hand dial is graduated to register by the movement of its hands each call up to 100, while the left hand dial registers the number of hundreds.

The indicating hand on this dial rotates through the space of one division for each complete rotation of the hand on the dial to the right. The figures indicate the actual numbers of calls for convenience in reference.

To operate the call register there is provided for each indicator a double pole magnet b, so connected as to be actuated during the time that the pilot lamp at the operator's position to which it corresponds is illuminated. While one end of this magnet is used for actuating the timing mechanism, the other is used solely for controlling the call registering needle. To this end, the armature b^1 is hinged to the ears b^2. The armature has lying beneath the magnet an angular extension which, through its engagement with a spring, holds the armature in a normal position remote from the magnet pole. When the magnet is energized, the attraction of its armature imparts sufficient movement to an operating arm b^4 and an attached pawl b^5 to cause the wheel b^6, with which the movable pawl engages, to advance through the space of one tooth. The number of teeth upon the wheel b^6 is equal to the number of divisions in the unit register, and the rotation of the spindle b^7, which is permanently attached to the toothed wheel, causes the movement of the attached indicator over one division of the dial, registering the call indicated by the pilot lamp on the switchboard. Turning with the spindle b^7 and wheel b^6 is a gear wheel b^9 which meshes with a wheel loosely mounted on a spindle associated with the timing mechanism. A pin attached to the latter gear causes the rotation of the wheel b^{12} through a space occupied by one tooth for each rotation of the wheel b^{10}. As the number of the teeth in the two wheels b^6 and b^{10} is so proportioned as to secure a reduction from 100 to 1, each engagement of the pin with the wheel b^{12} corresponds to one complete rotation of the hand on the unit dial, or 100 calls. As the rotation of the wheel b^{12} through the angle corresponding to one tooth advances the pointer b^{15} one division on the dial of "hundreds" a complete record of calls is obtained.

In practice it is found desirable to obtain a direct record of the number of calls answered by each operator. Rather than to obtain a continuous record for a position and subtract the number of calls answered at the time any operator begins work, it is preferable to start the counter at zero when she takes her seat. For this purpose restoring mechanism, of the sort frequently used in stop watches, consisting of the cam b^{16} and sliding rod b^{17} is used to set the indicators back to the starting point at the will of the chief operator.

For the timing mechanism a suitable simplified clock work arrangement, using a main spring associated with properly proportioned and inter-connected gear wheels, is provided. In order to start the timing mechanism simultaneously with the receipt of a call and to stop it when the call is answered by the operator, thus putting out the light, there is provided at the opposite end of the magnet from that which controls the call register an armature d^1 similar in shape to the one previously described. A lever d^2 is pivoted at d^3 and has one end connected to the armature d^1. This lever has one end pivoted to a link d^4, which in turn is connected to a sweep arm d^5, having one end, d^6, pivoted to the casing.

The sweep arm carries a spring shoe d^7, designed to engage the balance wheel of the timing mechanism. When the armature d^1 is attracted such a motion is imparted to this ingeniously arranged link work that the shoe is thrown lightly into engagement with the balance wheel, and then with a pronounced reverse movement starts the wheel in motion. This arrangement prevents the stopping of the balance wheel on the "dead center."

Tracing the operation of the complete device, it will be evident that when a subscriber calls the pilot lamp at his position is lighted. As the pilot lamp and the controlling magnet mounted in the indicator are wired in series with the switchboard light, the indicator pilot is illuminated, the call registered, and timing commences and continues until the release of the armature of the magnet due to the breaking of the circuit at the switchboard, which occurs when the operator plugs in and answers the call.

When the pilot lamp is illuminated, the chief operator may, if she wishes, depress the corresponding listening key, which is of the non-locking type, to ascertain that the conversation carried on by the operator is regular, and that she answers the call as soon as the answering plug is inserted in the jack. When an operator leaves the switchboard there will have been automatically made a record showing the number of calls, and the sum of the times which have elapsed between the receipt and response to the several calls. From this is computed the average time of the answering of each call received.

As a duplicate apparatus may be installed in connection with a disconnect pilot, a similar record for this feature of operating may also be obtained.

Although the registering feature of the device applies only to the interval elapsing before the operator inserts a plug in the answering jack, and not to the time preceding the operator's answer, this introduces no difficulty nor irregularity in the record. Strict instructions that calls shall not be plugged out before the operator is ready to answer are issued, and the ability to check the observance of these rules is conveyed to the chief operator by the provision of the pilot lamp and listening key, as above described. A fine is imposed for all violations of this rule, but they very seldom occur.

Upon the records furnished by this apparatus is based a system for the supervision of operating, which has enabled Mr. Hertford to build up the efficiency of the service in his exchange to a very satisfactory point, and his methods will be fully described in the future.

NEW YORK CAPITAL RECEIVING SERVICE FROM PROGRESSIVE INDEPENDENT COMPANY.

TWENTY-FIVE per cent. increase in business for the year speaks well for the enterprise of the management of the Albany Home Telephone Company, of Albany, N. Y. Operating in the capital city of the state, which is the headquarters for a particularly active competing company, the Independent organization has succeeded in increasing the number of its subscribers by about 1,000 during the past year, making the total number connected to its plant about 4,000. The only exchanges owned by this company are in Albany County, and are located at Albany, Watervliet and Green Island, the latter two being of comparatively small size. There are, however, connected to the system 375 toll stations, of which 200 have been added within a year; also 100 rural line subscribers, this being an extremely good showing for this district, which is quite thickly populated. About half of this class of business has been added since the last convention. Business is regularly interchanged with other Independent companies operating in Troy, Schenectady, Cohoes, Amsterdam, Ballston, Saratoga, Mechanicsville, Glens Falls, Hudson, Poughkeepsie, Kingston, Catskill, Rome, Utica and Chatham. Toll business is carried on by subscribers for a distance of 200 miles north, 100 miles southerly and 100 miles to the west. Unfortunately, the lack of proper Independent development in the cities of Western Massachusetts prevents the company from furnishing the connections desired by many of its subscribers, but it is hoped that this condition will be remedied before long.

Progress has been substantial, the plant is constructed according to proper methods, and further development of this territory should proceed at an extremely rapid rate. The officers of the company are: Howard Hendrickson, Pres.; Irving H. Griswold, Vice-Pres.; J. H. Prince, Jr., Sec.; H. M. Keys, Mgr.

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QUERIES

OPERATION OF AUTO-STARTERS.—(714.)

Will you please inform me how an "auto starter" operates in connection with a Westinghouse induction motor? R. J.

An auto-starter is a device used to start polyphase induction motors having short circuited secondary windings. In its stand-

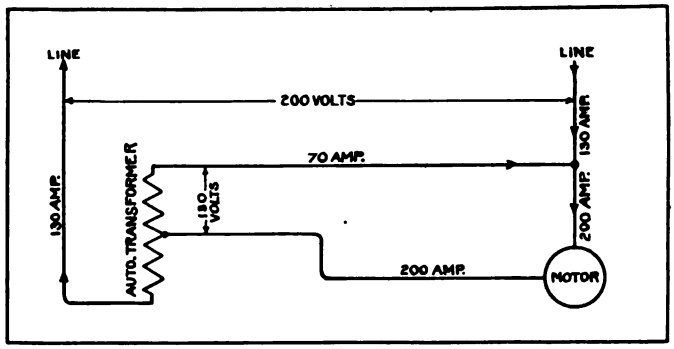

Fig. 714-a. Instantaneous direction and value of current in one phase.

ard form it consists of an oil-immersed switch of the drum type and two auto-transformers, so connected and operated that grad-

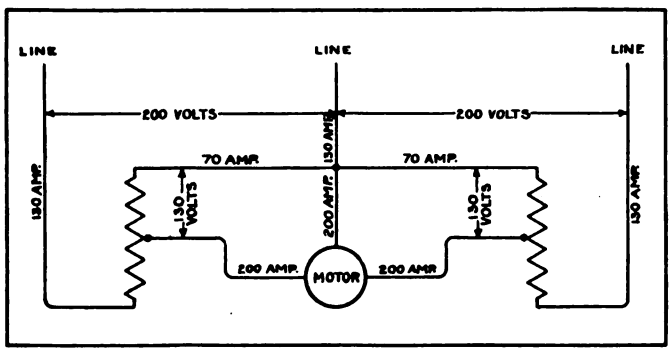

Fig. 714-b. Effective values of amperage at starting.

ually increasing voltages are applied at the terminals of the motor. In this way the starting torque is developed in a series of easy steps and the motor is gradually brought up to its full running speed. The method of starting the motor is illustrated in Figs. 714*b* and 714*c*. Fig. 714*b* shows a 3-phase auto-starter connected across a 200-volt line, the motor being connected to taps from the auto-transformers applying 130 volts to the terminals. Fig. 714*c* shows this combination diagrammatically when the motor is connected directly across the line. It should be noted that the auto-transformers are disconnected so that no current passes through them when the starter is in the running position. Figs. 714*d* and 714*e* are complete wiring diagrams for a 2-phase and a 3-phase circuit showing the connections between the line, the auto-starter and the motor.

The action of the auto-transformer is illustrated in Fig. 714*a*, which shows the instantaneous direction and value of the current in one phase of the motor circuit. It will be noted that the transformer is connectetd across a 200-volt line. The motor is connected from the line to a tap from the transformer giving 130 volts across the motor terminals. If we assume that the instantaneous value of the motor current is 200 amperes, the line current will be 130 amperes approximately, and the circulating current supplied by the transformer will be 70 amperes. This condition can be taken to represent two wires of a 3-phase circuit in which the current was zero in the third phase.

Referring to Fig. 714*b*, the effective values of the amperes at starting are given for all three phases of the motor and line. In this case it is also assumed that the motor current is 200 amperes. In a 2-phase circuit the arrangement of current is similar, as will be seen by the complete diagram, Fig. 714*d*. The action of the auto-transformer is similar to that of a regular transformer, the current being inversely proportional to the voltage, so that the line voltage times the line current is approximately equal to the motor voltage times the motor current, the excess current in the motor circuit being furnished by the transformer action.

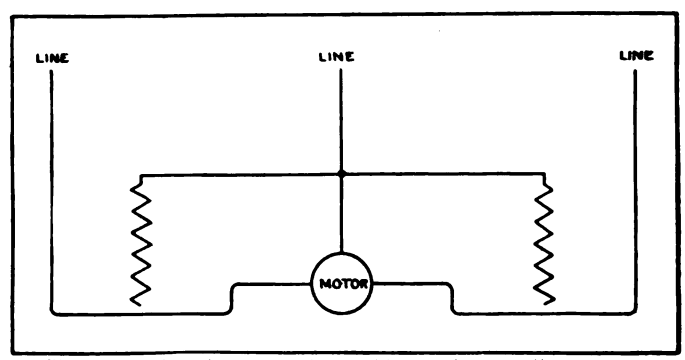

Fig. 714-c. Running connections, with transformers disconnected.

Torque: The torque of an induction motor is proportional to the square of the voltage applied at the motor terminals. By referring to Fig. 714*b*, the torque of the motor will be less than the torque if the motor were connectetd to the line by the ratio of 130 squared, divided by 200 squared. By referring to the curves in Fig. 714*b*, it is seen that when the motor is starting from rest, the torque gradually increases to a maximum and then drops off. Bearing these curves in mind, it may be readily seen that sufficient voltage must be applied to the motor terminals to produce sufficient torque to start the load. This voltage will

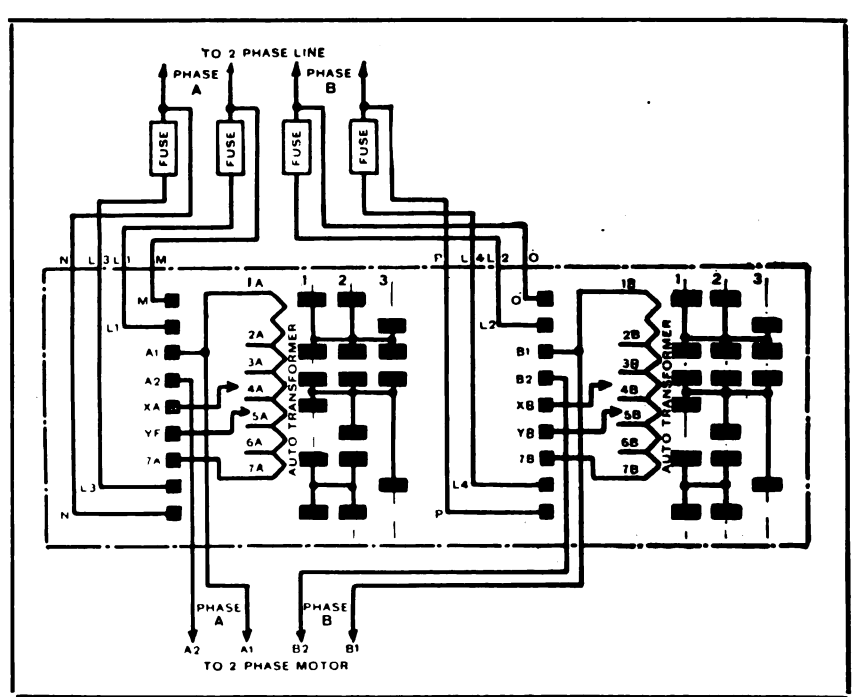

Fig. 714-d. Diagram of connections for auto-starter used in connection with motor running on two phase line.

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then bring the motor speed up until the torque of the motor reaches the torque of the load. At this point additional voltage must be applied to the motor terminals to increase the speed of the motor. This is similar to starting a direct current motor when the voltage at the motor terminals is changed by altering the resistance in the starting rheostat.

With the usual form of auto-starter, at least two starting notches are provided in addition to the running notch, so that the change from one voltage to another can be more gradual and the line current will be less than if only one starting notch were provided. Because of the self-induction of these motors a smaller number of starting steps are required than for direct current motors.

By referring to Figs. 714*d* and 714*e*, it will be seen that the auto transformers are provided with five intermediate steps. This permits of the auto starter being so connected that the first notch of the starter will impress sufficient voltage on the motor terminals to start the load. The second notch will then be connected to a tap on the auto-starter which will be midway between the first tap and the line. The connection for the starting notches should be made to the same voltage taps on the auto-transformer for each phase.

For instance, if XA is connected to 4A, then XB should be connected to 4B, YA should be connected to 6A, and YB should be connected to 6B. In this way similar currents pass through all windings.

Generally the line current at starting is considerably greater than the line current when the motor is brought up to speed. In the standard motors the line current is generally two and a half times as great as the full load current when the motor develops full load torque at starting. Usually, however, these motors are started up light so that considerably less line current is required at starting. In most cases, however, this line current will exceed the full load running current and any fuse placed in this line would open during starting. To avoid this, extra leads are brought out of the auto starter and connected to the line beyond the fuse. These leads, which are marked M, N, O and P, are used only in the starting positions, the wires leading through the fuses being disconnected at this time. On the third or running notch of the auto starter the leads M, N, O and P are disconnected and the line wires L_1, L_2, L_3 and L_4 are connected to the line through the fuses. This matter is made clear by reference to the two-phase diagram, Fig. 714*d*.

(Continued on page 423.)

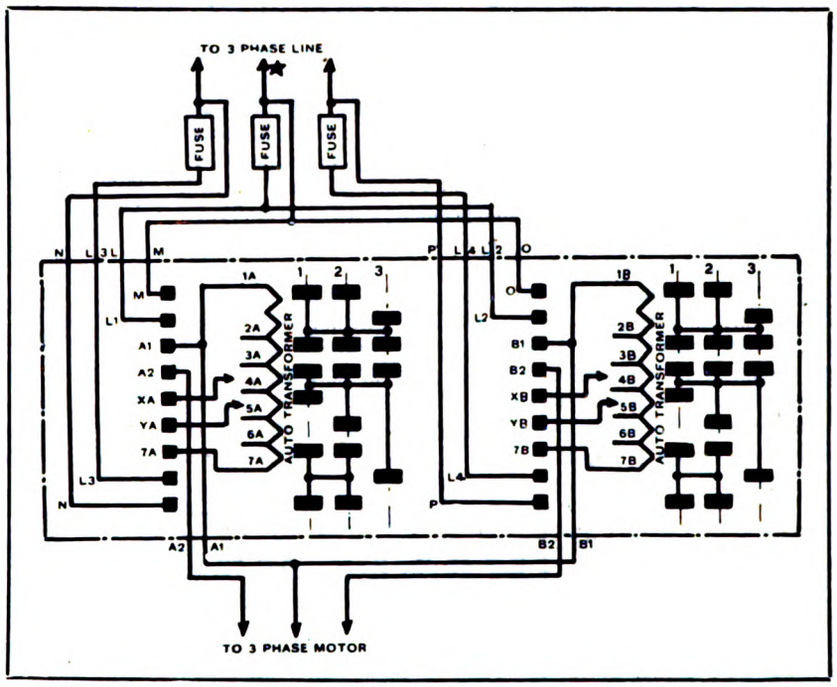
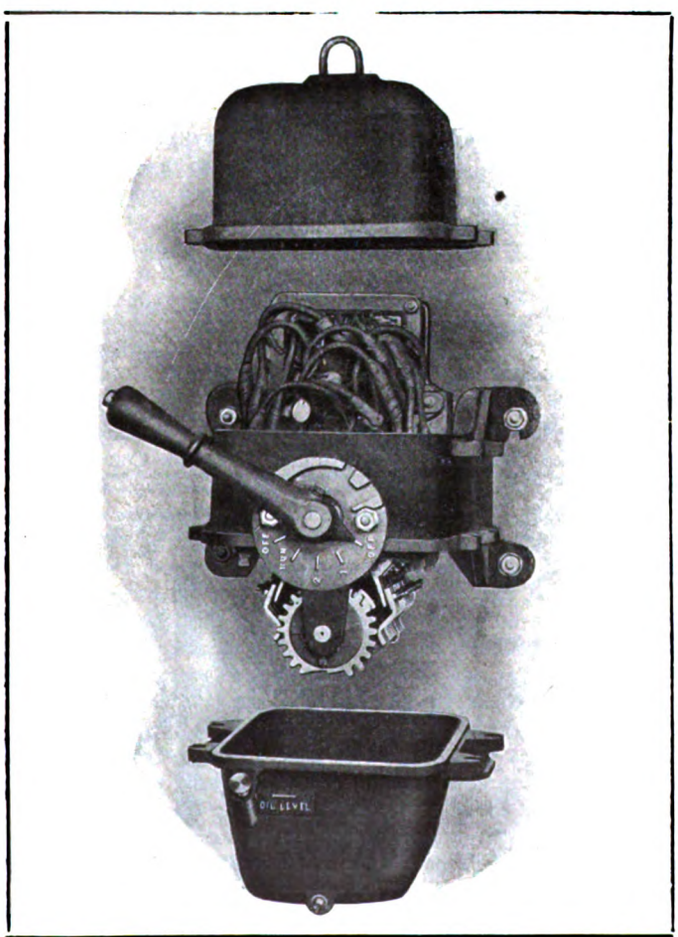


Fig. 714-e. Diagram of connections for C C L auto-starter on three phase line.



View of Auto-starter, with Cover Raised and Tank Lowered.

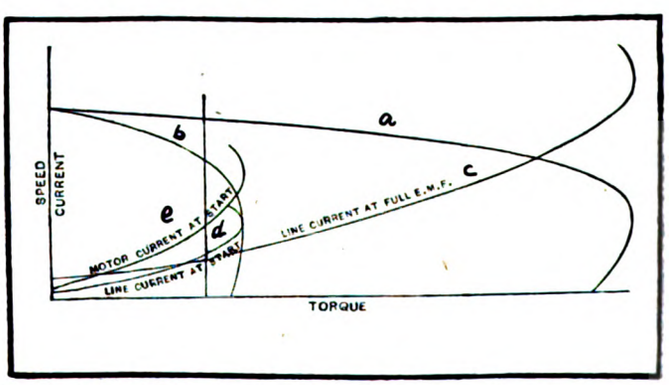


Fig. 714-f. Curves a and b are torque curves; curves c. d and e are current curves. Curve a is torque at full voltage; curve b is torque at starting voltage.

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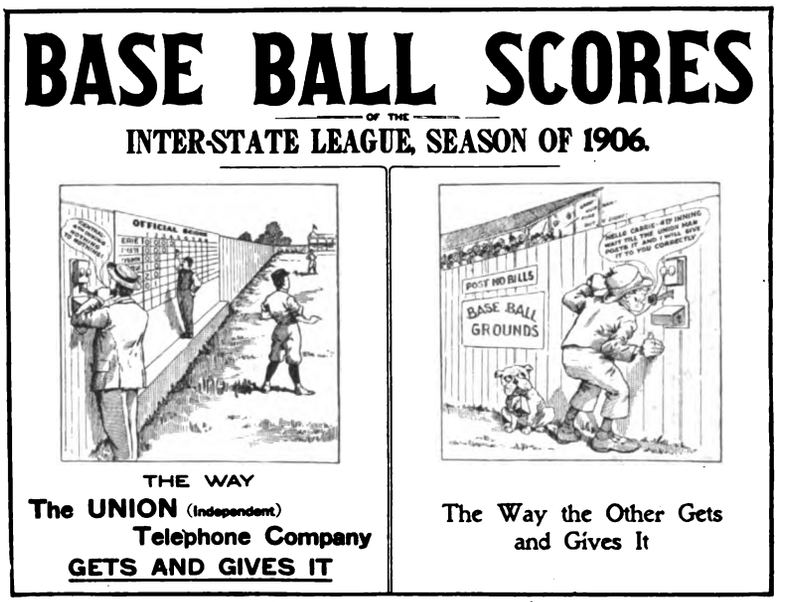
IN THE OPERATING FIELD

REMARKABLE PROGRESS OF INDEPENDENT COMPANY IN ITHACA, NEW YORK.

ENTHUSIASTIC support of the Independent Telephone Company by the people of Ithaca, N. Y., and vicinity has contributed to make its growth extraordinarily rapid. Last September the company had between 1,200 and 1,300 telephones; now about 3,200 are connected to its exchange at Ithaca, and various lines entering this district which are controlled by the company. Operating in a territory which was well developed by the Bell Company the latter's system is being gradually broken up. Not long ago the George Junior Republic, of Freeville, N. Y., signed a contract with the Independent Company, which gives it a switchboard, instruments and Independent service. The Trumbull Corners Company was up to the middle of last January a sub-licensee of the Bell Company. The benefits of Independent service were, however, too obvious, and a contract with the Ithaca company was entered into. Later an attempt to buy stock by the Bell concern was frustrated by the purchase of a controlling interest by friends of the Independent movement.

In Newfield, Enfield, Mecklenburg and Trumbulls Corners there are now approximately 100 subscribers each, and the Ulysses Telephone Company, operating in the towns of Ulysses and Hector, has a long distance contract with the Ithaca Company. Contracts with other small companies in the vicinity furnish connection with all the neighboring towns, so that the Independent development of the county is remarkably strong. New lines are being added constantly, and one toll section, as well as one rural and two local sections have recently been added to the switchboard. The construction is of the highest character, and the nature of the service is such that the Bell Company, which formerly completely controlled the territory, is said to have now telephones only in Ithaca, and a few toll stations in the surrounding country.



The Union Tele. Co., of Erie, has Placarded the Town with the Poster of which this is a Reproduction. Its Competitor Does Not "Stand In" with the Base Ball Men.

HOME TELEPHONE COMPANY RAPIDLY BUILDING UP ITS SYSTEM IN HAMILTON, OHIO.

DURING the past year Hamilton, Ohio, has seen the growth of the Independent Telephone Company proceed constantly until it now furnishes service to 30 per cent. more people than were connected a year ago. This company, which is managed by the following officers, F. M. Hughes, President; J. W. Sloneker, Secretary; W. Gilbert Thompson, General Manager; operates in Butler County, Ohio, and has exchanges at Hamilton, Trenton, Somerville, Reily, Shandon and Bethany, of which Trenton and Shandon have been added within a year. The principal exchange, which is operated on the common battery system, is at Hamilton, and has 2,100 subscribers, representing a very fair development in the town, which, however, is bound to increase still further in the future. Eighteen toll stations have been established in the surrounding country, and furnish service to many people. Exceptionally satisfactory results have been obtained by this company in securing rural line subscribers, the number of which has been doubled during the past year, making a total of 800. This class of business is handled over 90 separate lines, of which 40 have been added to take care of the 400 additional subscribers. One hundred miles of toll line are also operated by the company. These furnish the desired connection to Independent companies in Oxford, O., and Brookville, Ind., and completely cover Butler County, O., connecting with the lines of the United States Long Distance Company for service to the larger and more remote cities of the state. A plant which can be maintained very economically is installed, there being 5 miles of underground cable, and 12 miles of aerial cable of different sizes in service, of which there have been added two miles of each during the past year. Still further increases are expected in the business of this company at a rate proportionate to the extremely good showing which has been made in the past.

DEVELOPMENT OF TOLL STATION BUSINESS OF TRI-STATE COMPANY HAS BEEN NOTABLE.

NEW exchanges for three different towns have been added to the plant of the Tri-State Telephone and Telegraph Company, which has headquarters at Minneapolis. Large exchanges at St. Paul, White Bear, Faribault, Albert Lea, Litchfield and Grand Forks are owned by this company, with 23,700 telephones connected in the seven towns. This, however, does not represent the total size of the system, as in addition the company operates 15 common battery exchanges, and lines in the smaller towns, not enumerated here, bring the total number of subscribers up to 70,000. During the past year 3 new common battery exchanges have been built, and 5,500 new subscribers have been connected. A vast system of toll stations, of which there are at present 1,100, 200 having been added during the past year, furnish service throughout many counties.

The local company was originally conducted separately, under the name of the Twin City Telephone Company, but has recently consolidated with the Tri-State Telegraph and Telephone Company, thus acquiring the large local business which has been described. The original Tri-State was purely a long distance company, and has brought into the new organization, which bears the same name, 2,500 miles of toll line, which has been increased from the 1,900 miles which were in service last year.

Extensive construction work has been carried on during the past year in all cities where exchanges are operated. In Minneapolis alone there have been added 124,535 feet of 100 pr. cable, 174,620 feet of 200 pr. cable, and 66,894 feet of 400 pr. cable, as well as enough cable of other sizes to bring the total amount of underground cable up to 527,837 feet. Of aerial cable there have been added 531,176 feet, including 171,268 feet of 100 pair, 278,109 feet of 50 pair and others of sizes varying between 150 and 25 pair. Proportionate extensions have been made at St. Paul and other cities. These figures give a very inadequate idea of the extent of this extremely important system, but are

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GRAY PAY STATIONS OR MONEY MAKERS

LAST A LIFETIME

THE MORE YOU USE THEM THE SMOOTHER THEY WORK

Nothing Moves But The Money

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

A CATALOGUE AWAITS YOUR ADDRESS

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—A ten thousand dollar telephone plant in Northern Indiana; part cash will take some good real estate. No competition; ten-year franchise; no better investment. Address Box 634, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 634

SUPPLIES WANTED

For use of operating companies wishing to purchase or sell second-hand equipment or supplies. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED—A second hand fifty or one hundred drop switchboard in good condition made by the Sumter Telephone Manufacturing Company. Address F. P. Linder, Hartwell, Ga. 626

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Telephone inspector for telephone manufacturing concern. One familiar with circuits, interior and long distance telephones. Address Inspector, Box 628, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 628

MR. MANUFACTURER, our business is to create and delevop A MARKET FOR YOUR PRODUCT. We can sell your entire output at less expense and risk that you can do it. If you have a good thing but don't know how and where to sell it, write us. Hapgoods Sales Company, 305-309 Broadway, New York, U. S. A. Offices in eight American cities and London, England. 464

WANTED—Position in purchasing or advertising department of large operating or manufacturing company by energetic young man of experience and ability. Five years in present position. Address, Box 624, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 624

WANTED—Position as manager of a good exchange. Have had over 5 years' practical experience and am graduate in telephone engineering. Can furnish best of references. Address, Box 632, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 632

WANTED—Chief operator desires to change location. Experienced operator on large multiple boards. Now handling 15 operators. Can give best of references. Address Box 633, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 633

WANTED—A man for "noisy line" work by a large telephone company. Must be able to inspect, recommend and to supervise the erection of any remedy recommended for elimination of noise on toll lines. Must be competent to successfully deal with any noisy line condition. Address Box 635, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 635

POSITION WANTED—A first-class switchboard man desires position with an Independent company. Central energy multiple board preferred. Can furnish references from present and past employers. Address Box 636, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 636

GENERAL STORAGE BATTERY CO. BIJUR "HIGH DUTY" NEW YORK

Low Charging Voltage

Built for Severe Service

Low Internal Resistance

DO NOT BUCKLE

GENERAL OFFICES:
42 BROADWAY
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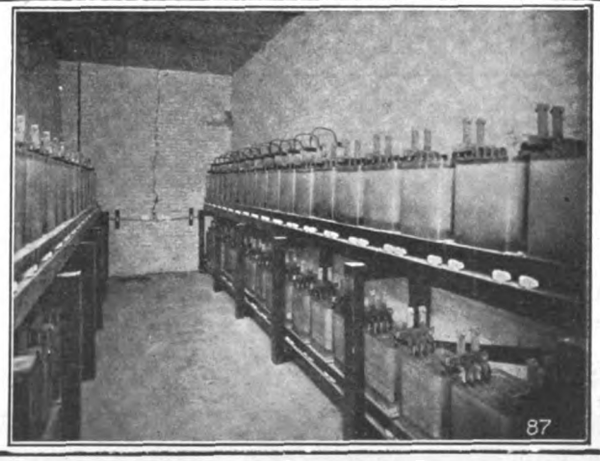
BOONTON, N. J.



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IN THE OPERATING FIELD

sufficient to show that the growth and progress in this locality has been rapid, and that conditions are extremely favorable for further extension of the Independent company. The officers of the company are: President, E. H. Moulton, Vice President, L. L. C. Brooks; General Superintendent, L. D. Richardson.

LARGE SYSTEM IN ONE ILLINOIS TOWN BUILT UP IN LITTLE MORE THAN A YEAR.

IN Freeport, Ill., the Stephenson County Telephone Company is making an extremely good showing, having built up a very large subscription list in a little over a year. The company operates a single common battery exchange in Freeport, which is a city of about 15,000 population. Connected to its exchange there are 1,725 subscribers, of which 1,488 have been added since the last convention. This it will be seen is somewhat higher than one telephone for every ten people, and is far ahead of the Bell Telephone Company in the same town, the latter company having only 550 subscribers.

Service to the surrounding country is given by means of 25 toll stations. Connections are also made for about 150 rural lines, having an aggregate of 1,500 subscribers. Development in this class of business had proceeded to a very considerable point before the extreme activity of the past year caused the city subscribers to be so largely increased, consequently the rural line growth has resulted in the additional connection of only about 200 subscribers. The lines for this class of rural business are not owned by the Stephenson County Company, but receive service through its exchange. Contrasted to this high development, the Bell Company is said to have not over 500 rural line subscribers, and to have added only 40 to 50 during the past year.

The amount of toll line operated by the company conforms to its policy of thoroughly developing the local territory without reaching out extensively to other places. About 60 miles are owned directly, and the company controls the operation of about 50 miles more, owned by companies closely associated. The toll line plant owned by the company is, however, nearly double what it was a year ago. Considerable aerial cable is used in the city, there being about five miles in service, of which two have been added within a year. The company has an extensive system of connections with Independent companies operating in neighboring towns. Service is interchanged with the following: Carroll County Tel. Co., Savanna, Ill.; Daviess County Tel. Co., Galena, Ill.; Ogle County Tel. Co., Rochelle, Ill.; Dixon Home Tel. Co., Dixon, Ill.; Rockford Home Tel. Co., Rockford, Ill.; Interstate Ind. Tel. & Tel. Co., Sterling, Ill The toll business over the above system is growing rapidly, and from Freeport and the connecting rural lines messages are sent over the entire eight counties of Northwestern Illinois and two counties in Southern Wisconsin.

OPERATION OF AUTO STARTERS.

(*Continued from page 421.*)

The standard auto starter is arranged for connecting both two-phase and three-phase. On a three-phase circuit the sides of the line M and O are connected together, also lines L_1 and L_2.

The operation of the auto starter is as follows:

The handle is moved from the off position to the first starting notch. After the motor has come up to its full speed on this notch the handle is moved to the second starting notch and thence to the running notch. In order to stop the motor the handle is moved one notch further. This throws the switch to the off position and the handle is disconnected from the switch so that it may again be returned to the starting position. The advantage of this is apparent, as it gives a quick brake in going to the off position and the switch is not dragged back over the starting notches, causing unnecessary burning on these notches. The handle is arranged with a thumb latch which locks it securely in the off and running positions. A ratchet wheel inside the controller indicates the two starting notches and prevents the handle being returned from the running notch to the off position past the two starting notches.

PROGRAM OF THE ANNUAL CONVENTION OF THE NATIONAL-INTERSTATE TELEPHONE ASSOCIATION.

Auditorium Hotel, Chicago, June 25-28th, 1906.

JUNE 25TH.

10 A. M.—Meeting of Committees:
Standard Forms of Accounting.
Standardization of Equipment.
Standard Operating Rules and Regulations.
1:30 P. M.—Meeting of Executive Council and Advisory Board.

JUNE 26TH.

Convention called to order, 2 P. M.
Address of Welcome: Hon. Edward F. Dunne, Mayor of Chicago.
Response: E. H. Moulton, Minneapolis, Minn.
President's Annual Address: Jas. B. Hoge, Cleveland, Ohio.
Reports of Officers.
Appointment of Committees.
Question Box.

JUNE 27TH—MORNING SESSION.

Meeting called to order at 10 A. M.
Report of Entertainment Committee.
Discussion and Action by the Convention.
Roll Call of States.
Paper: "Official Organs—National and State." Chas. S. Norton, Indianapolis, Ind.
Discussion.
Paper: "Look for the Shield." R. A. Walker, Des Moines, Iowa.
Paper: "Telephone Publicity—Appealing to Public Opinion." Mr. Ivy L. Lee, New York City.
Discussion.

AFTERNOON SESSION.

Report of Committee on Standard Forms of Accounting.
Discussion and Action by the Convention.
Paper: "Independent Advertising—Getting Results." W. B. Woodbury, Detroit, Mich.
Report of Committee on Standardization of Equipment.
Discussion and Action by the Convention.
Address: "Southern Toll Lines and Exchange Developments." L. G. Parker, Louisville, Ky.
Paper: "Telephone Revenues." W. P. Hemphill, Topeka, Kas.
Question Box.
Informal Banquet at White City, 6:45 P. M.; Col. J. D. Powers, Louisville, Ky., Toastmaster.

JUNE 28TH—MORNING SESSION.

Meeting called to order at 10 A. M.
Report of Committee on Standard Operating Rules and Regulations.
Discussion and Action.
Paper: "Suggestions—How to Finance Small Telephone Properties." Theodore Gary, Macon, Mo.
Paper: "Texas." By J. B. Earle, Waco, Tex
Reports of Outstanding Committees.
Discussion and Action.
Presentation of New Business.
Question Box.

AFTERNOON SESSION.

Meeting called to order at 1:30 P. M.
Transaction of Unfinished Business.
Report of Nomination Committee.
Election of Officers.
Installation of Officers.
Farewell Address: Dwight E. Sapp, Mt. Vernon, Ohio.

BANQUET PROGRAM.

Toastmaster, Colonel J. D. Powers, Louisville, Ky.

SPEAKERS.

"Change and Exchanges." J. H. Shoemaker, Waterloo, Iowa.
"The Land of the Jack Oak and the Paw Paw." Jesse W. Weik, Greencastle, Ind.
"The Great Northwest." Chas. E. Sumner, Portland, Oregon.
"Our Rural Telephone Business—What Shall the Standard Be?" Nelman F. Wing, Grass Lake, Mich.
"Why Are We Here?" J. Walter Barnes, Fairmont, W. Va.
"Buckeye Briefs—and Other Things." Hon. H. M. Daugherty, Columbus, Ohio.
"What We Have Done to the Rocky Mountain Bell in the Rocky Mountain Country." Elmer B. Jones, Salt Lake City, Utah.

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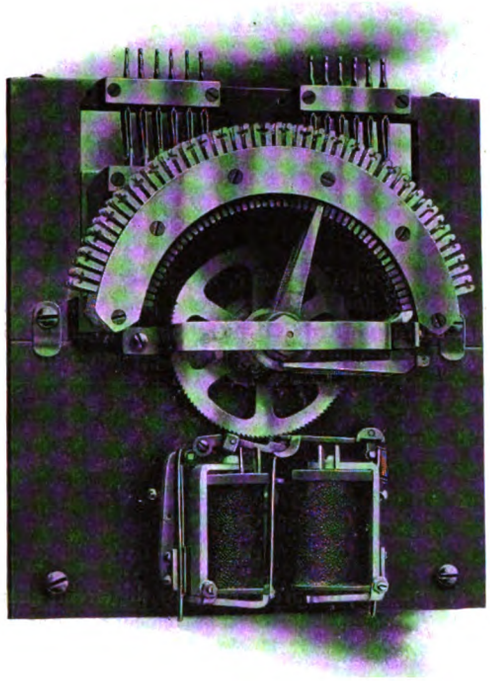

A GENTLEMAN prominent in the Independent operating telephone field, and a telephone engineer, recently wrote us, "I wish to again thank you for the pleasant trip, and the privilege of seeing your apparatus, which I consider the most revolutionary of any yet produced in the telephone business." He voices the sentiment of all who have seen it.

Our system is simply perfection in perfect simplicity. We have, as pronounced by prominent telephone engineers, a thoroughly complete, simple and perfect system, by which we do automatically everything necessary in a thoroughly up-to-date telephone system; a number of things never before thought possible in either manual or automatics, and many things which cannot be done manually. We use less switches and parts than any other system.

We can change your present central energy manual system to automatic without the necessity of changing the telephones. This is an enormous saving, and it will pay you to investigate.

We install exchanges of any capacity.

Write us for our pamphlet No. 666, which describes our system.

AMERICAN AUTOMATIC TELEPHONE CO.

200-206 SOUTH AVENUE, ROCHESTER, N. Y.

Sandwich Pole Changer Company
400 Eddy St., Sandwich, Ills.

Do You Get Our Rings? If not write or Prices and Catalogues of our

Pole Changers
Ohmmeters
and
Duplexers

Guaranteed to you.

DUPLEXERS

That Will DUPLEX
THE ILLINOIS AND SANDWICH DUPLEXERS

Let us make

3 Metallic Circuits Out of 2 Circuits

for you. You can divide your Metallic Circuits. You can give an Independent Circuit to one or more subscribers.

You Can

Increase Your Toll Lines 100 per cent.

THAT DUPLEX

These Duplexers are provided with a very simple but efficient

Balancing Device

A child can balance your lines instantly with this switch after your Duplexers are once installed.

You need not buy before being convinced of their true value We send our instruments on 30 DAYS' FREE TRIAL So you may know how much TIME and money they will SAVE you. Write and let us know your needs We can do you a great amount of good for a small outlay of money.

SANDWICH POLE CHANGER COMPANY, 400 Eddy St., Sandwich, Ills.

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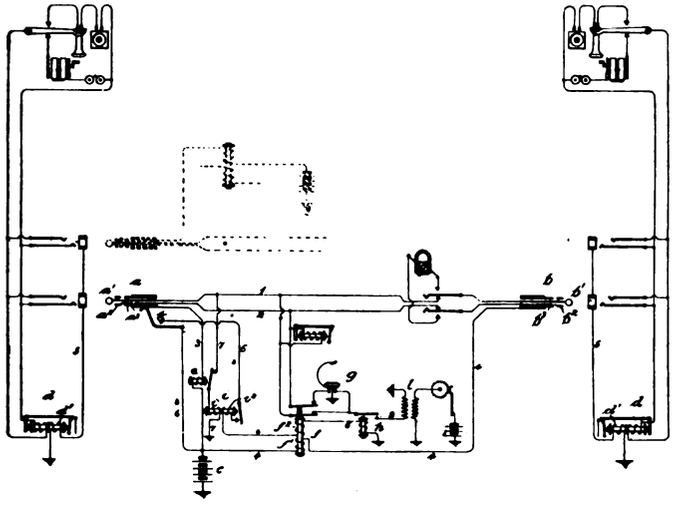
TELEPHONE PATENTS

SECRET SYSTEM.

Henri A. André, Paris, France, patents (No. 816,894; dated April 3, 1906; filed April 27, 1904; serial No. 205,089) and assigns to the Western Electric Co., Chicago, Ill., a secret switchboard system.

The object of this invention is to prevent operators from listening on a busy circuit. This is accomplished by auxiliary apparatus, including a plug seat switch, *k*, which closes its contacts when a plug is removed from its seat, a cut off relay *f* to open the operator's listening circuit from the line and a transformer *l*, one winding of which includes an interrupter and the other terminates at ground and the open contact of relay *h*.

When an answering plug is inserted in a jack it raises the potential of the sleeve circuit, current flowing from battery *c* and wire 3 through the sleeves of plug and jack to ground. If an operator attempts to insert a plug in a busy line the tip comes in contact with the sleeve thimble of the jack, and battery will



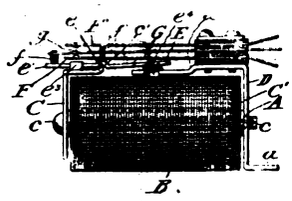
then flow over the tip circuit of the cord to ground through winding i^2 of relay *i*. Circuit 6 will then be closed and relays *f* and *h* actuated, causing the disconnection of the operator's receiver from the line and the application of the busy test, the circuit of which is completed through contacts of relay *h* to the receiver ground.

When a calling plug is inserted in a jack, circuit 4 is completed and the relay *f* actuated by means of winding f^1. It will be apparent by tracing out this circuit that an operator is enabled to answer a call and ascertain the number desired, but after the calling plug has been inserted in a jack it is impossible for her to listen, owing to the fact that the wiring to her receiver is open at the relay contacts.

RELAY.

Charles Lane Goodrum, Rochester, N. Y., patents (No. 808,834; dated Jan. 2, 1906; filed November 11, 1905, serial No. 286,925) a relay.

In this invention is shown a new design for a relay which has for its object the arrangement of the parts to obtain a maximum effect with a given current and to secure facility in assembling. Attached to the core *A* of the magnet B are two pole pieces *C* and *D*. Pole piece C is provided with an upturned knife edge ridge c^1 which forms the pivot for the armature *E*. Pole piece *D* is utilized as a support for the circuit changing springs. The armature *E* is provided with a notch *e*, which engages in the ridge c^1 of the pole piece *C*, and forms a pivotal point for the movement of the armature in a vertical direction. Insulating pins f^2 perform the double function of holding the armature in position



by reason of a downward pressure exerted by the circuit changing springs and also of preventing a lateral movement of the armature. Strips of non-magnetic material, e^3 and e^4, prevent actual contact between the armature and pole pieces, and thereby eliminate danger of these parts sticking together when no current flows through the relay winding.

The inventor describes in detail means for manufacture which reduce the cost, and which also enable the coil to be readily removed when so desired without altering the adjustment for the contact members.

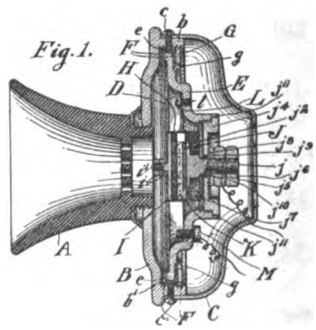
TRANSMITTER.

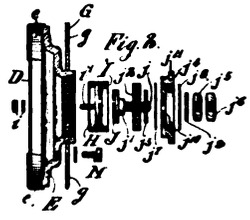
Michael Setter, Chicago, Ill., patents (No. 819,084; dated May 1, 1906; filed October 31, 1904; serial No. 230,759) and assigns to the Automatic Electric Company, Chicago, Ill., a transmitter.

In this invention means are disclosed for the design of a transmitter in which the transmitting mechanism consisting of the diaphragm, carbon chamber electrodes, and rear support are constructed in the form of a unitary structure, interchangeable with the containing case.

Referring to the illustrations, the frequently used bridge support is supplanted by a cup or cone plate *E*. To this the diaphragm *D* is attached by a clamping ring *e*. The carbon chamber *H* is clamped to the diaphragm by means of the stem i^1 and nut *i*. The rear of the chamber is closed by the felt ring j^2 held in position by clamping ring j^3 pressing it against the rear electrode, which is held in position by the externally threaded supporting member j^4, which also serves to adjust the distance between the electrodes by means of the direct pressure it exerts upon the clamping ring j^5. Mica rings j^7 and j^8 insulate the rear electrode from the containing case and adjusting member j^4.

The transmitter front plate, *B*, is formed with an internally





threaded flange *b*, which engages the clamping ring *G* of the containing case *E*, and holds it in position. With this construction it will be evident that the transmitting unit can be readily removed for repairs or substitution; and that the rear electrode can be withdrawn from the unit by unscrewing the adjusting member j^4.

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To Unnecessary Clerks	?	**Who**
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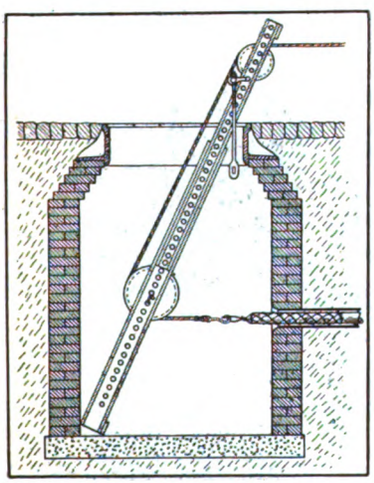
IMITATION is the sincerest flattery. Others have tried to imitate our **"Gem" Wire Grip.** The tremendous number of orders received since January 1, 1906—being over 3,000 more up to date than we received during the whole year of 1905—makes us feel that our device has passed from the experimental stage. We can offer no better testimonial than this, and feel positive that nobody else can.



All large telephone and power companies are now using our **"Gem" Wire Grip** to the exclusion of all other methods, thus its practicability is assured.

We solicit your inquiries.

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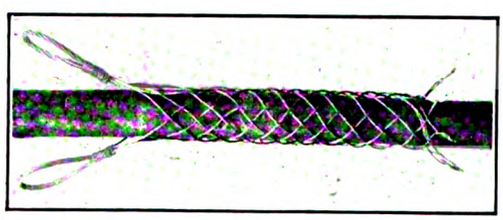

DOUBLE EYE "GEM" WIRE GRIP
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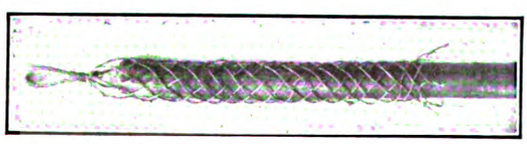
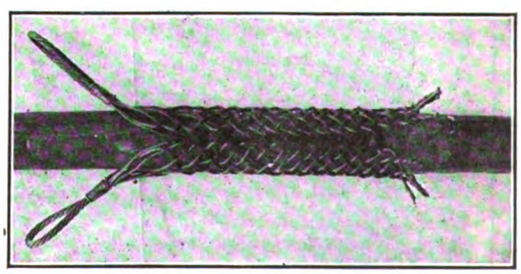


SINGLE EYE "GEM" WIRE GRIP
For Aerial or Underground Cable



SPLIT "GEM" WIRE GRIP
It Displaces the Half Hitch of Marline for Taking in Slacks

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

MAKING A CALCULAGRAPH RECORD.

EXACT accounting for all toll conversations by means of legibly stamped and accurately timed toll tickets may be obtained through the proper use of the calculagraph.

To commence a record a toll ticket is placed in the left hand end of the slot with the printed side downward. The back of the ticket should be pressed lightly against the rear of the slot, and with the fingers resting lightly upon its surface it should be slid to the right until it strikes the guide post. When it has reached this point it is in the correct position to be stamped, and the right hand lever should be pushed in the direction away from the operator, as shown in Fig. 1. Considerable force should be exerted and the lever kept moving until the rear end of the cam touches the top of the main plate. This prints upon the face of the ticket the time of day. The ticket should be left in the same position, where it should have been held constantly by the pressure of the fingers, and immediately after the lever has been pushed in the direction away from the operator as far as it will go it should be pulled sharply toward her until the front end of the cam touches the main plate (Fig. 2). This prints upon the ticket the two "elapsed time" dials. The ticket should then be removed and the operator is ready for printing similar records upon other tickets as the connections are put up.

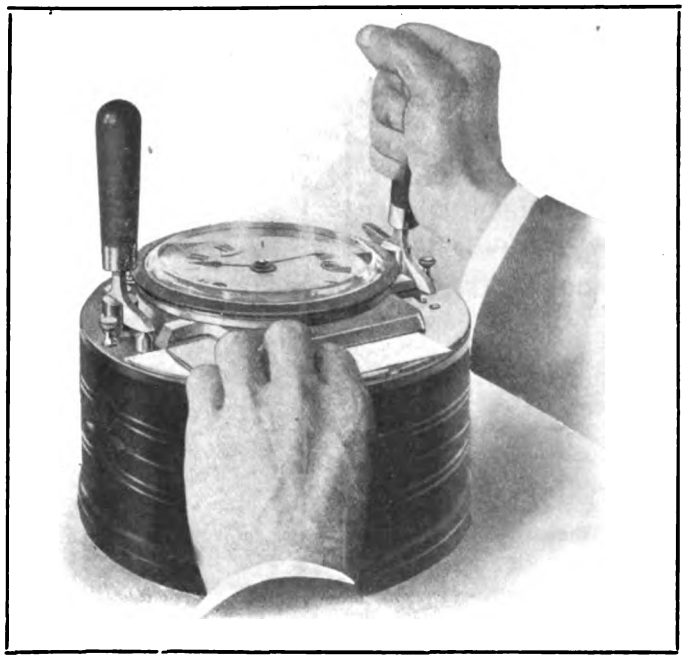

Fig. 2. Immediately after the time of day has been printed the operator pulls the same lever forward, thus printing the elapsed time dials.

When it is desired to record the end of a conversation the proper ticket should be taken up and again inserted in the slot in the same position as at first. This time, however, the left hand lever is used to stamp the marks which complete the record. It is pulled forward—that is, toward the operator—until its cam point touches the plate, as illustrated in Fig. 3. The pull should in this case also be vigorous. This operation prints arrows in the centre of the two elapsed time dials, and the arrows are pointed to figures on the dials which represent the time which has elapsed since that record was commenced. Exchange managers who are having trouble in checking their toll business by other means may obtain valuable information by writing the Calculagraph Company, 1437 Jewelers' Building, New York City.

THE TRUMBULL ELECTRIC MANUFACTURING CO., Plainville, Conn., has recently issued the sixth edition of its catalogue dealing with switch and panel board apparatus. In it are listed switches for all purposes and current carrying capacities, each type being accompanied by a table which gives full information relative to the different sizes and prices. Particular attention is drawn to the switch adapted to the needs of telephone or battery service. This is an all copper switch mounted on porcelain with self-adjusting jaws. In the rear portion of the catalogue, panel boxes and small switchboards are listed and described. Copies will be mailed to parties interested upon receipt of a request.

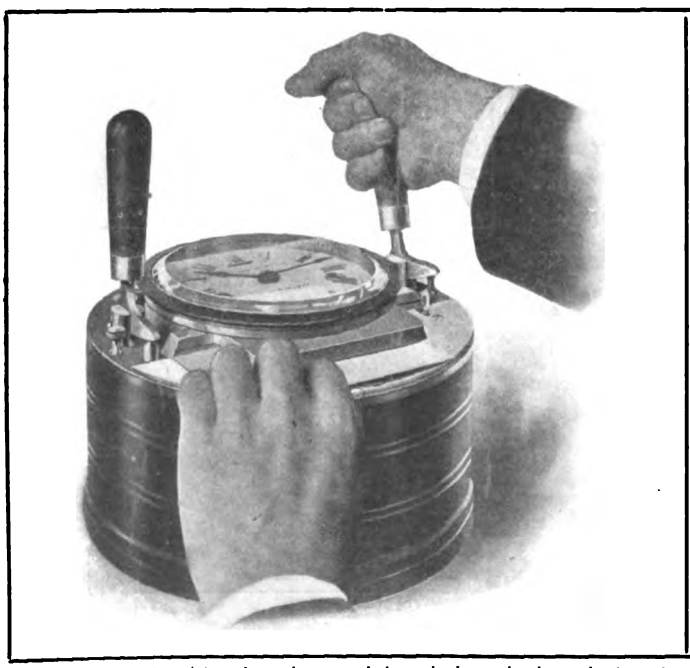

Fig. 1. With the ticket face downward in calculagraph slot a backward motion of the right hand lever prints the time of day.

Fig. 3. The record is completed by a strong forward pull on the left hand lever, which prints arrows in the elapsed time dials.

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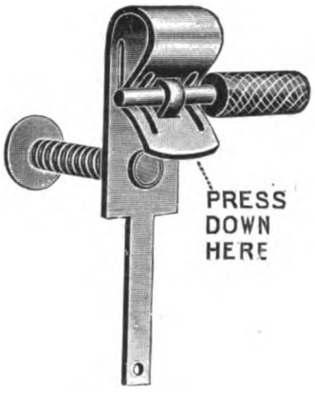
A NECESSITY



On distributing frames, dry batteries, and wherever permanent or temporary electrical connections are made

THE NO. 11

Fahnestock Spring Binding Post

was made to the special order of a large telephone company. It has an extra long lug and is well suited for use on distributing boards and other places about an exchange. Manufacturers of the leading dry batteries will supply their cells fitted with Fahnestock post without extra charge.

We carry a number of different styles in stock. Write for our new booklet.

Special designs made to order.

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Get your tools together and let an exact machine work them for you—that is what the Calculagraph does. It accurately times your toll messages, prints the elapsed time on a card, enables you to work your toll lines to their fullest capacity.

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challenges investigation. It does not crystallize, dry up or freeze, and possesses the greatest recuperative powers of any battery ever made. Indorsed by the leading telephone companies and telephone manufacturers—we could summon an army of witnesses to prove the exclusive merit to be found only in the Rock Island. Its trademark is

A SYNONYM FOR ALL THAT IS BEST

in a dry cell battery. **Heaviest zinc, highest** voltage, **greatest** current capacity and **longest** life are combined in the Rock Island.

Our Standard No. 8 is the best battery for higher class work. Standard No. 6 is the regular size for general purposes.

Department D will be glad to quote you prices.

At the National-Interstate Telephone Association at the Auditorium Hotel, Chicago, Ill., June 25-28, the Rock Island Battery exhibit in Room 136, parlor floor, will be worth a visit. COME. This invitation is for YOU.

Rock Island Battery Co.

Ninth and Sycamore Streets

CINCINNATI, O.

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IN THE MANUFACTURING FIELD

A NEW V. B. RINGER.

SIMPLICITY of adjustments and wearing parts is the most striking feature of the ringer recently brought out by the Vote-Berger Company, of La Crosse, Wis.

In its general construction the company states that care has been taken to make a piece of apparatus in which the working parts are all accurate, the winding perfect and the magnet made from the best steel obtainable, highly and permanently tempered. The cores and armature are made from the best quality of Norway iron, annealed after all machine work is finished. In place of the cone point screw, used by most manufacturers to support the armature, a pinion bearing is employed, which not only allows a free movement but prevents the possibility of the ringer being put out of adjustment by inexperienced help. The armature is adjusted when it leaves the factory and cannot be changed by the inefficient trouble men in exchanges that cannot afford high class help able to do this work properly.

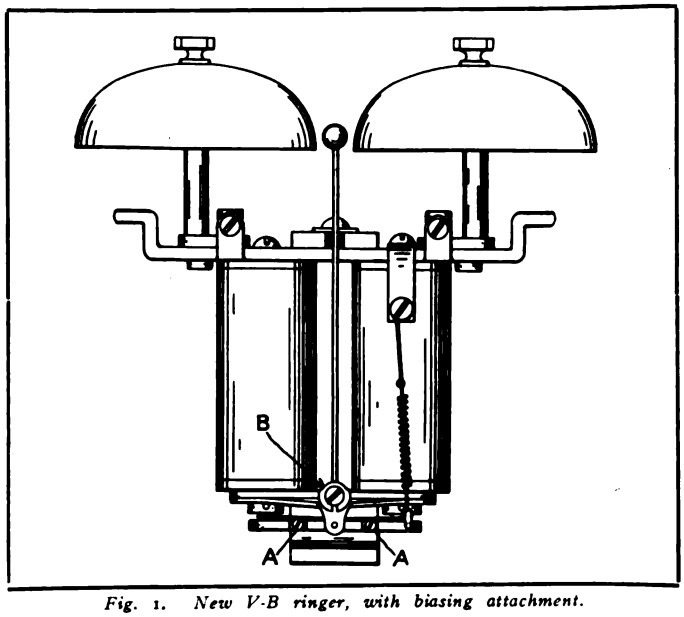


Fig. 1. New V-B ringer, with biasing attachment.

The adjustments are the main feature of the ringer and are certainly unique. Fig. 1 shows a drawing of the ringer, with the biasing attachment. In order to set the support of the armature farther from the cores all that is needed is to twist the screw B to the right. Twisting it to the left draws the armature support closer to the cores. The screws A-A are only used when the ringer is biased and are for the purpose of adjusting the distance from each core to each end of the armature. A mere twist of these screws to the right increases the length of the stop on the armature, and hence does not allow it to come so close to the core at the end of the stroke. This ringer can be adjusted for pulsating currents in not more than thirty seconds.

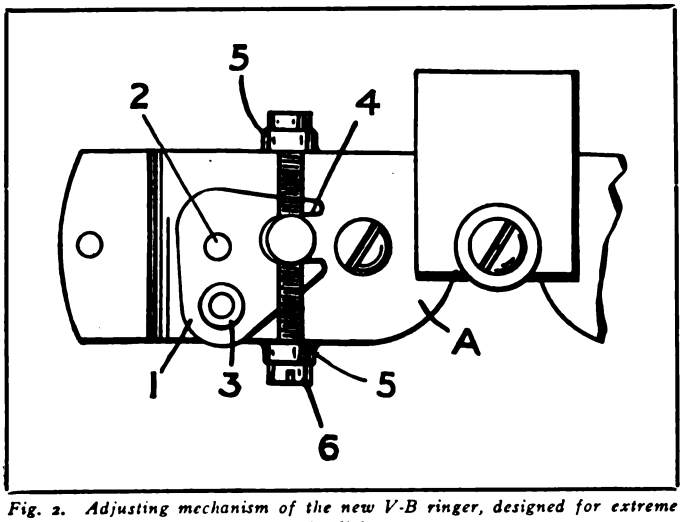


Fig. 2. Adjusting mechanism of the new V-B ringer, designed for extreme simplicity.

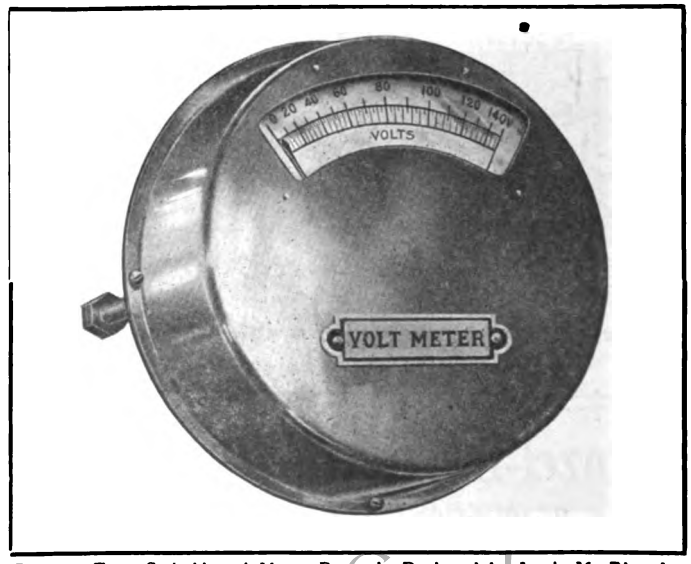
The gongs are adjusted by means of the screw shown at the top, and the means of adjustment are more fully shown in Fig. 2. By turning to the right the screw marked No. 6 in Fig. 2 the gong is swung away from the centre. This is accomplished by means of a bell crank, 1. This crank is riveted to the frame A by the rivet 2, about which it turns. The gong post, 3, is riveted to this bell crank. The stud, 4, plays freely in the slot of the bell crank and is threaded to fit the screw 6. When the screw 6 is twisted to the right, the bell crank is drawn down by the traveler 4, so that the gong post 3 is swung outwardly. This not only makes an extremely rigid construction, as everything is mounted firmly on the frame, but also makes the adjustment extremely simple.

It will be noticed that all adjustments are made with an ordinary screw driver, no wrenches being required; also that in making the screw driver adjustments it is never necessary to get at the back of the ringer nor to get at it from either end.

THE PIGNOLET SWITCHBOARD METERS.

ESPECIALLY adapted to conditions prevailing in many telephone exchanges is the style of measuring instrument recently developed by Louis N. Pignolet, 78 Cortlandt street, New York. Both voltmeters and ammeters are furnished in various readings up to 150 volts and 50 amperes respectively. The instrument is enclosed in a cylindrical case 5 inches in diameter and 1½ inches deep, which, although in keeping with the simplicity of the instrument which assists in securing economical construction, is attractive in design. It is finished in polished nickel, but this may be changed to other styles if specified.

The instruments are especially designed to permit of attachment to switchboards by two bolts, which are provided on the back of each meter. These also serve to convey the current, so that but two holes in the board are required. The permanent magnet principle, which enables high accuracy and an even scale division to be secured, has been adopted for the working parts of



Compact Type Switchboard Meter Recently Designed by Louis M. Pignolet.

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HAVING specified GORDON CELLS for your switchboard transmitters, small central energy systems, etc., you need not worry further about the battery part of your equipment. You may then enjoy that peculiar sense of satisfaction which comes in knowing that you have ordered the BEST; a battery which has been used on all kinds of telephone work for the past ten years and, under all conditions, has given such entire satisfaction that it is now the STANDARD TELEPHONE BATTERY.

The first cost may be a little higher, but ask some disinterested telephone man who has used GORDON CELLS for several years, and he will tell you that the original investment was a wise one, for he realizes now that he has saved MONEY—not to mention the fact that he has not had to worry about his battery, and has given it no attention since he set it up.

Those manufacturers who send GORDON CELLS with their equipment are WISE; they realize that the BEST battery contributes in no small degree to the successful working of their apparatus.

It is no trouble to recharge the GORDON CELL now because complete interiors are sent with each recharge.

GET A COPY OF OUR NEW CATALOGUE AT THE CONVENTION OR WRITE FOR IT

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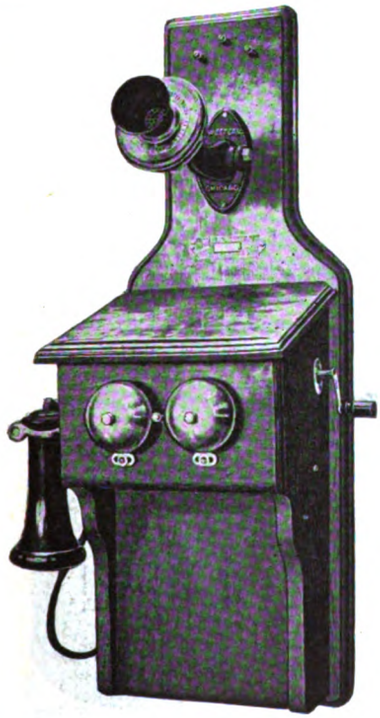

Bridging Telephone.—Type M.
This style of cabinet also made into:
3-Bar, Series, Type "K"
4-Bar, Bridging, Type "L"
with any ringer resistance desired.

Western Pioneer Telephone

Five-Bar Bridging

Our **New Western Pioneer** telephone can be furnished for all classes of **special service** such as **ring through, non-interfering, divided circuit, central checking party line** and in fact can be used where any generator call telephone is now being used. The apparatus used in this instrument is of **New Western design.**

The **common battery type** of **magneto telephone** is becoming popular. The cabinet is compact and neat in appearance, all parts are **conveniently mounted,** the wiring is simple and the cabinet will accommodate a **three, four or five-bar generator.** We manufacture all of the parts used in this instrument. When the upper compartment is open the generator, ringer, hook switch, induction coil and receiver binding posts are exposed. When the battery box is removed by sliding downward, the batteries and battery connections are exposed.

WRITE FOR OUR GREEN BOOKLET

WESTERN TELEPHONE MFG. CO.

"The Pioneer Independent Telephone Factory"
Established 1893

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the instrument. The magnets are of imported special steel, carefully treated to insure permanency. The designer of this instrument claims that it fully meets the requirements of telephone managers who desire to secure accurate measuring instruments at prices which permit of their use for general testing.

GORDON CELLS.

LOWERING the cost of battery maintenance to a very small amount is said to have been accomplished by the designer of the improved Gordon cell, several parts of which are illustrated upon this page. Although all of the fundamental parts which have contributed to the success of this cell in its old form have been retained they have been so simplified that they may be quickly and easily handled. The complete cell has only seven parts. The copper oxide or negative element is used in flake form and is shipped in perforated metal cylinders of the type illustrated in Fig. 2. The perforations of the cylinder are closed in such a way as to prevent leakage in shipment.

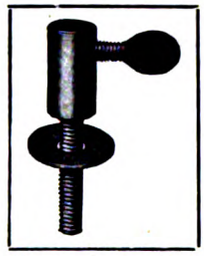

Fig. 1. Gordon binding post.

Attached to the outside are three porcelain insulating supports upon which rests the zinc. By this means it is prevented from coming in contact with the copper to form a short circuit within the cell. The circular form of the zinc (Fig. 3) enables it to be slipped over the cylinder, where it is supported by the lugs. A heavy insulated wire is attached to the zinc and is run through the cover of the jar, being left long enough for making a connection with the next cell. The solution contains a high grade of caustic soda, which is shipped in powdered form in sealed metal cans (Fig. 5).

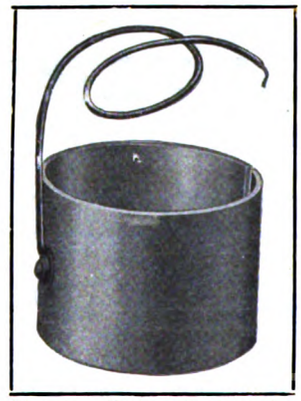

Fig. 3. Zinc and connecting wire used in new Gordon battery.

The jars are made of glass, porcelain and enameled steel and are fitted with tin, porcelain and fibre covers. The binding post used by the company is illustrated in Fig. 1. As will be seen, it is simple in construction, strong and neat appearing, and as it is manufactured with considerable care, is durable.

The creeping of the solution by evaporation is prevented by pouring on the top of the cell the contents of a small bottle of paraffine oil (Fig. 4), which is shipped with each cell or recharge. The company claims for a battery of this type, in addition to its simplicity of construction, the advantages of a strong and constant current and guarantees for various types and sizes a specific number of ampere hours. The battery is said to work equally well upon an open or closed circuit. The cost of renewal is small and the nature of the elements is such that local action is eliminated and the internal resistance of the cell is extremely small. Low temperature does not interfere with the working of the battery. The cell may be easily kept clean and the absence of unpleasant odors is an important feature. As the life of the cell is long and the cost of material and labor for making renewals is very small the company is meeting with gratifying success. It will be pleased to send further information to whoever makes inquiries.

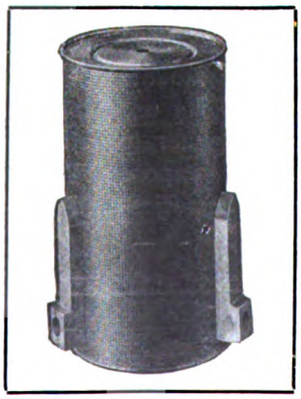

Fig. 2. Cylinder containing negative element of Gordon cell.

Fig. 4. Bottle of paraffine oil for Gordon battery.

THE GRAY TELEPHONE PAY STATION COMPANY, 64 Asylum street, Hartford, Conn., has recently filled an order for what is probably the largest number of slot machines ever installed in a single store. This was for 1,600 of the company's new model No. 24 pay stations, which were recently placed in John Wanamaker's in Philadelphia. These instruments are for use with a branch exchange system where telephones are provided at every counter. The slot machines are used for the collection of coins from customers of the company who are allowed to talk from any instrument in the retail dept.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, O., has been paying especial attention to the design of appliances fitted to meet both regular and special needs of high grade distribution work. Its line of material deserves careful consideration by managers who are anxious to reduce maintenance expenses.

THE INDIANA STEEL AND WIRE COMPANY, Muncie, Ind., has issued some very interesting information concerning its double galvanized telephone and telegraph wire. The company states that it employs improved processes of galvanizing by means of which a coating is given to the wire which will withstand the severest tests of a telephone company. It is said that experiments conducted in some of the leading college laboratories have shown that this wire is above the ordinary standard, and the company will be pleased to have an opportunity to give definite information concerning these tests to all persons who are interested.

STROMBERG-CARLSON CABLE PLANT ENLARGED.

ABOUT two weeks ago the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., broke ground for a large extension to its cable plant. This new building will cover a ground space of 313x175 feet. It is to be one story with saw-toothed roof to correspond with the balance of the plant. To take care of this large extension the company has provided a new 750 horse-power Hamilton-Corliss engine direct connected with a 550 K. W. direct current generator. There have been also provided two additional boilers of the Murphy type of 191 horse-power each. This large addition to the plant requires the erection of another stack or chimney equal in size to the present stack.

Fig. 5. Sealed metal can of caustic soda for Gordon battery.

The building is to be used for the manufacture of aerial and underground cable, also the various insulated wires, cords, etc., made by this company, the business in which has been growing so rapidly.

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Cat. No. 707 List Price, $.32 Std. Pkg. 150

DISCOUNTS

Standard package.....50—10%
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SWITCHES
FOR RURAL LINES

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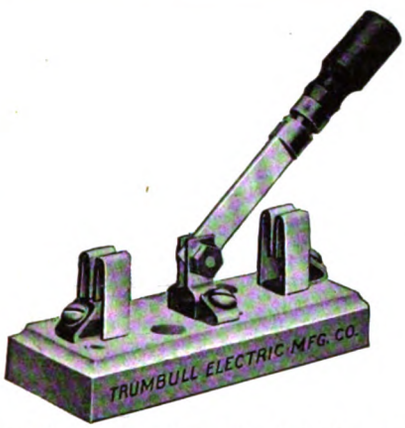

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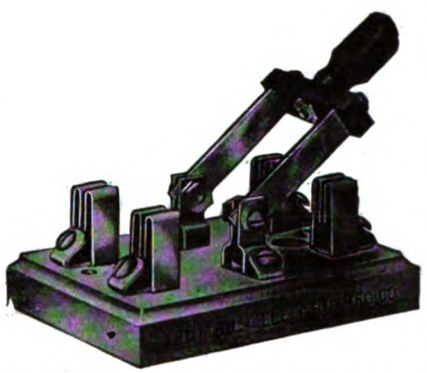
and many places in every telephone exchange.

The *Trumbull Switch* is the best you can buy.

It is *All Copper* and overcomes all the disadvantages of Porcelain Base Switches.

Write for sketch of Rural Line Connection and catalogue of other specialties.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Ave., Plainville, Conn.



Cat. No. 710 List Price $.54 Std. Pkg. 50

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CENTRAL **No. 650** CENTRAL

REMEMBER—There is always something worth the time in exhibit of the up-to-minute "show YOU" house in the "show-me" State

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"EVERYTHING TELEPHONIC—NOTHING ELSE"

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THE WEEK'S MESSAGES

NEW COMPANIES.

TROY, ALA.—The Orion Telephone Company has been organized at Troy. It will build a line from Troy to Orion, Pine Level and China Grove. W. C. Starke, of Troy, is president, and W. G. Chancy, of Orion, secretary and treasurer.

DURANGO, COL.—The Florida Mesa Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are G. W. Spencer, R. L. Alexander, P. A. Stark, of Durango.

PAONIA, COL.—The Grand Mesa Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are A. L. Binford, C. C. Hawkins, W. W. Follanshie, Paonia.

CARLYLE ILL.—The Citizens Telephone and Telegraph Company has been incorporated with a capital stock of $15,000. The incorporators are T. E. Ford, A. Westermann, H. V. Murray.

STRASBURG, ILL.—The Strasburg Mutual Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are J. F. Kull, Martin Hamm and L. J. Kircher.

SPURGEON, IND.—The Spurgeon Telephone Company has been incorporated with a capital stock of $2,000. B. A. Humphrey is president.

OLATHE, KAS.—The Olathe & Pioneer Telephone Company has been incorporated with a capital stock of $5,000.

ROSSVILLE, KAS.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $5,000. The directors are C. A. Taft and D. Kerr, Meeker, Okla.; W. G. Hall and T. A. Ward, Rossville, and L. J. Hardan, Midlothian, Okla.

SOUTH EVERETT, MICH.—The South Everett Farmers' Telephone Company has been organized with the following officers: President, E. L. Hornbeck; secretary, H. E. Douglass; treasurer, M. H. Angevine; superintendent construction, E. L. Hornbeck. The company's lines will connect with those of the Citizens Company at Newaygo.

PALO, MICH.—The Fenwick Telephone Company, Palo, has been incorporated with a capital stock of $8,000.

TWINING, MICH.—The Arenac-Ogemaw & Losco Telephone Company, Twining, has been incorporated with a capital stock of $1,000.

HANLEY FALLS, MINN.—The Hanley Falls Telephone Company has been organized with a capital stock of $10,000. The officers are I. Johnson, president; L. S. Orwoll, vice-president; W. E. Hanson, secretary; H. M. Hanson, treasurer.

RICH HILL, MO.—Gander Bros. are interested in the formation of an Independent telephone company at Rich Hill.

SWANTON, NEB.—The Swanton Mutual Telephone Company has been incorporated with a capital stock of $5,000. The company will construct and operate a telephone system in and around Swanton.

AVON, O.—A new Independent Telephone Company is being formed with a capital of $20,000, to give service to Avon, French Creek and Dover Center. The company will be controlled by capitalists at Lorain, but will be independent of the Black River Telephone Company. The central exchange will be at Avon.

IRONTON, O.—Robert A. Knapp contemplates the formation of a new Independent Telephone Company at Ironton. The company will be capitalized at $5,000, and it is the intention of the incorporators to install one of the best plants to be found in southern Ohio.

TORONTO, O.—The Toronto & New Cumberland Telephone & Telegraph Company has been organized with a capital stock of $15,000 by Salem business men, including W. S. Holloway, R. V. Hampton, M. L. Young, Harry Young and C. L. Smith. Franchises have been secured at Toronto and New Cumberland, and the new company will install a system throughout that territory.

SPENCER, OKLA.—The Spencer Mutual Telephone Company has been incorporated with a capital stock of $3,300. The incorporators are C. C. Kramer, W. L. White and H. W. Malott, of Spencer; H. L. Lain and D. P. Sweeney, of Jones City.

TYRONE, OKLA.—The Tyrone Local & Long Distance Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are C. L. Clark, A. J. Hughes and others.

LEESPORT, PA.—The Farmers' Rural Telephone Company has been organized at Leesport.

MILWAUKEE, WIS.—The Wisconsin Metropolis Telephone Company has been incorporated with a capital stock of $100,000. The incorporators are L. N. Biron, of Bloodgood, Kemper & Bloodgood; J. A. Wallis and A. C. Moeller.

STOCKBRIDGE, WIS.—The Stockbridge and Sherwood Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are Jos. Bast, G. P. McKenney and Henry Hoffman.

SELKIRK, ONT., CAN.—The Erie Telephone Company has been incorporated with a capital stock of $10,000. The directors of the company are E. Hoover, A. Yager, G. E. Dashner, all of the township of Rainham, Ont.

TORONTO, ONT., CAN.—The Norton-System Telephone Company has recently been organized with a capital stock of $100,000.

FRANCHISES.

PORTERSVILLE, CAL.—An application for a franchise to build and operate a telephone system in Portersville has been filed by H. F. Scorrille, of Corona.

YUBA CITY, CAL.—E. V. Jacobs, of Meridian, has applied for a franchise to construct and operate a telephone system in Yuba City.

WINSTED, CONN.—The Farmington Valley Telephone Company, owning an Independent line running from New Britain to Winsted, has been granted a franchise to build through Cornwall and Goshen.

WORCESTER, MASS.—The Citizens Telephone and Telegraph Company, of Worcester, has applied for a franchise at Leominster.

ST. HILAIRE, MINN.—Messrs. Simons and Bourdon, of Red Lake Falls, have been granted a franchise to construct a telephone system at St. Hilaire. Their lines will be connected with those of the Tri-State Company when that company builds through St. Hilaire.

BARLOW, N. D.—The Farmers' Mutual Telephone Company, of Barlow, has been granted a franchise to construct a telephone system in Foster county.

NECHE, N. D.—F. E. Corson, of Fargo, N. D., has been granted a telephone franchise at Neche.

NEW STRAITSVILLE, O.—The Home Telephone Company, of Logan, is endeavoring to obtain a franchise at New Straitsville. The company's intention is to establish direct connections between New Straitsville and Logan, Columbus and other points.

CLEAR LAKE, S. D.—The Citizens Electric Light and Telephone Company has ben granted a franchise to construct a telephone system at Clear Lake.

ANACORTES, WASH.—The Farmers' Mutual Independent Telephone Company has applied for a franchise to construct a telephone system to connect with the Independent system in Seattle.

LOYAL, WIS.—The Local Telephone Exchange Company has been granted a franchise at Loyal, Wis.

INGERSOLL, ONT., CAN.—The Ingersoll Telephone Company has been granted a twenty-five year franchise at Ingersoll.

FINANCIAL.

DES PLAINES, ILL.—The Des Plaines Telephone Company has increased its capital stock from $10,000 to $14,000.

EMINGTON, ILL.—The Emington Telephone Company has declared a dividend of $5.00 on each share of its stock.

COMFREY, MINN.—The Comfrey Rural Telephone Company at its annual meeting declared a dividend of 15 per cent.

MONROE CITY, MO.—The Farmers & Merchants Telephone Company has increased its capital stock from $3,000 to $6,000.

CLEVELAND, O.—The Cuyahoga Telephone Company is to declare a 4 per cent annual dividend on its common stock.

LOGAN, O.—The Logan Home Telephone Company has increased its capital stock from $50,000 to $75,000 and will make many improvements in its system.

COMBINATIONS.

FAYETTE, MO.—The Mutual Telephone Company has purchased the Shepler Telephone System.

NORTH LOUP, NEB.—The Ord Telephone Company, of Ord, has purchased the business of the local telephone company at North Loup.

ELECTIONS.

AVON, ILL.—The Avon Mutual Telephone Company has elected the following directors: G. C. Osborn, G. E. Simmons, S. S. Clayberg, A. Sundberg, O. Crissy, G. E. Merrill, A. Merrill, L. R. Lockwood and W. H. Clayberg.

MILLSTADT, ILL.—The Millstadt Telephone Company has elected the following officers: President, Geo. Sauthoff; vice-president, A. Marxer, Sr.; secretary, A. C. Kern; treasurer, G. F. Baltz.

PEKIN, ILL.—The Citizens Telephone Company has elected the following directors: J. W. Barrett, John Fitzgerald, J. A. Roelfs, V. P. Turner, E. R. Peyton, Henry Roos and W. B. Cooney.

NEW ALBANY, IND.—The Eureka Telephone Company has elected the following officers: President, E. F. Windell; secretary, H. C. Beanclossom; treasurer, H. C. Hays.

MT. ORAB, O.—The Mt. Orab Telephone Company has elected the following officers: Geo. Kratzer, president; Cary Layman, vice president; I. L. Edgington, secretary; P. A. Wickerman, treasurer; A. R. Watson, general manager.

BLOSERVILLE, PA.—The Bloserville Telephone Company has elected the following officers: President, J. S. Darr; vice-president, C. H. Leib; secretary, A. H. Calaman; treasurer, G. R. Fry; manager, J. E. Barrick.

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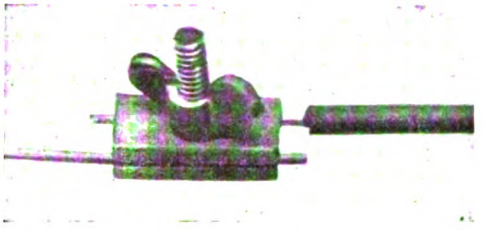

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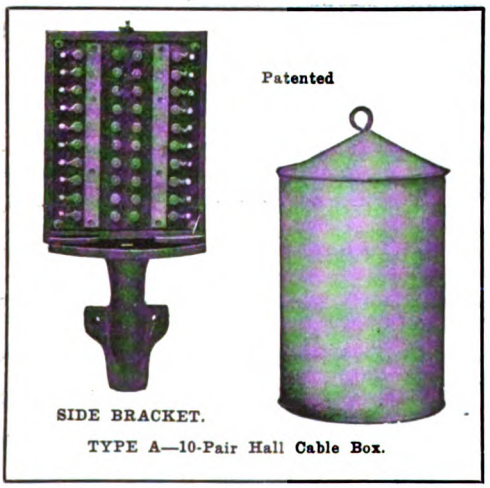

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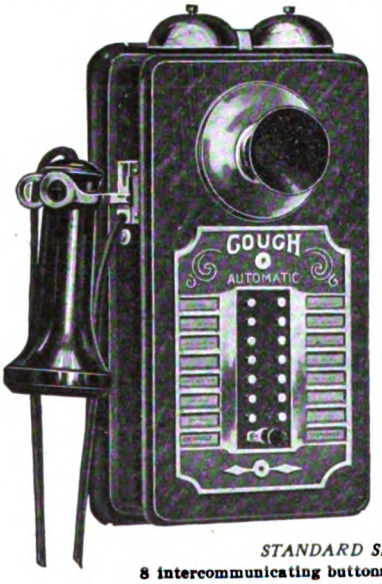

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THE WEEK'S MESSAGES

ORANGE, TEXAS.—The Orange Telephone Company has elected the following officers: President, E. L. Bruce; vice president, A. L. Ford; secretary and general manager, E. P. Weber; treasurer, W. D. Dean.

SHERMAN, TEXAS.—The Grayson County Telephone Company has elected the following directors: W. B. Ritchie, Ed. Christian, W. J. Ritchie, C. D. Crites, Lima, O., and S. W. Porter and C. A. Shock, Sherman, Texas.

BARABOO, WIS.—The Farmers' Mutual Telephone Company has elected the following officers: Robert Attridge, president; E. R. Thomas, vice-president; L. H. Palmer, secretary; O. A. Getchell, treasurer.

MOEVILLE, WIS.—The Moeville Farmers' Telephone Company has elected the following officers: Ole Erickson, president; S. S. Reitan, vice president; Martin Kjelstad, secretary; T. S. Fidem, treasurer.

JANE LEW, WEST VA.—The People's United Telephone Company, of Jane Lew, has elected the following directors: S. G. Hall, G. W. Forinash, C. W. Davisson, J. A. Oldaker and M. J. Kester. The company expects to make many extensions to its lines.

BELOIT, WIS.—The Beloit Telephone Company has elected the following officers: President. M. J. Ward; vice-president, W. H. Grinnell; secretary and manager, Alfred Slater; treasurer, W. M. Brittan. The additional directors are W. W. Lufkin and C. B. Salmon.

LA CROSSE, WIS.—The La Crosse Telephone Company has elected the following directors: W. W. Cargill, F. P. Hixon, Henry Gund, G. H. Gordon and I. H. Moulton.

PERSONAL.

VERNON L. CLARK has been appointed local manager for the Consolidated Telephone Company at Phoenix, Ariz.

A. C. DOTY has been appointed manager of the plant of the Delaware & Madison Counties Telephone Company at Elwood, Ind.

JOHN DUFF has been appointed manager of its exchange at Blair, Neb., by the Nebraska Telephone Company.

JOHN FAINT, of Philadelphia, has been appointed manager of the system of the Bedford County Telephone Company with headquarters at Bedford, Pa.

A. C. MILLER, who has been manager of the Redwood County Rural Telephone Company, of Minnesota, has accepted a position as salesman with the Vote-Berger Telephone Manufacturing Company, of LaCrosse, Wis.

L. J. OLIVER, formerly manager of the Southern Bell Telephone & Telegraph Company's exchange at Columbus, Ga., has been promoted to the office of superintendent of the seventh district.

RAY B. POOLE has been made superintendent of the Rome Home Telephone Company, with headquarters at Rome, N. Y.

L. W. RIGBY has been transferred to the exchange at Ensley, Ala., of which he will have charge, by the Southern Bell Telephone and Telegraph Company.

W. B. ROBERTS has been promoted from the position of manager of the Atlanta exchange of the Southern Bell Telephone & Telegraph Company to that of assistant superintendent of the district. He will retain the active management of the Atlanta exchange as a part of his new duties.

H. L. SMITH has returned to Atlanta, Ga., from Savannah, where he has made his headquarters as superintendent of the fifth district of the Southern Bell Telephone & Telegraph Co., in order that he might take up new work as special agent to the general manager.

F. M. SOMMERKAMP has been appointed manager of the Southern Bell Telephone Company's exchange at Columbus, Ga.

W. E. SUMNER has been promoted to the office of auditor for the Consolidated Telephone Company, with headquarters at Tucson, Ariz.

F. A. VAN DORSTEN has been made manager of the exchanges of the Sunset Telephone Company at San Jose and Santa Clara, Cal.

MISCELLANEOUS.

LONG BEACH, CAL.—The Long Beach Home Telephone Company, formerly owned by W. L. Porterfield, with exchanges at San Pedro, Santa Ana, San Bernardino, Ventura and a number of other places has been acquired by a number of Los Angeles men headed by J. M. C. Marble. The price paid for these properties was $1,350,000.

MONMOUTH, ILL.—Henry S. Brown, of Monmouth, has purchased a controlling interest in the Roseville Telephone Company. The system will probably be extended.

VIRGINIA, ILL.—J. G. Pratt has purchased the Ashland, Ill., telephone exchange.

TOLEDO, O.—The Toledo Home Telephone Company has closed a contract to install a private branch exchange to replace that of the Bell company, for the Pope Motor Car Company.

New Construction in the Field

BENTON, ARK.—The Benton Telephone Company is to be connected with Detoni, Corwin, Nuna, Shaw, Belfast and Sheridan.

WEISER, IDAHO.—The Idaho Independent Telephone Company, of Boise, is to install a telephone system at Weiser. It is contemplated that the company will expend about $10,000 on this work.

YATES CITY, ILL.—The Ideal Telephone Company of Yates City is to make many improvements in its system.

CHICKASHA, I. T.—The Topeka & El Reno Telephone Company is installing a new switchboard at Chickasha, and is to give its system a general overhauling at that point.

CEDAR FALLS, IA.—The Corn Belt Telephone Company is to spend between $15,000 and $25,000 in improving its system at Cedar Falls.

COUNCIL BLUFFS, IA.—The Independent Telephone Company, of Council Bluffs, is building a line to Balfour, and expects to extend the line on south and west.

DYERSVILLE, IA.—The Interstate Telephone Company is to build a line from Dyersville to Farley and one from Farley to Metsington.

KELLERTON, IA.—The Kellerton Mutual Central Telephone Company is considering the advisability of building a line to Mt. Ayr.

PERRY, IA.—The Hawkeye Telephone Company is to rebuild and enlarge its exchange at Perry, Ia.

AITKIN, MINN.—The Aitken Telephone Company is to extend its lines from Nichols to Wealthwood, and later on to Malmo.

NEW ULM, MINN.—The New Ulm Rural Telephone Company is preparing to construct lines in Lafayette, Courtland, Cottonwood, Milford and Sigel.

WILLMAR, MINN.—The Willmar Telephone Company will spend $11,000 in improving its plant.

MOUND CITY, MO.—The Mound City Independent Telephone Company will soon be connected with the Hanamo Telegraph & Telephone Company.

FREDONIA, N. Y.—The Fredonia Telephone Company is to establish an exchange at Cassadaga, and operate a branch system covering Lily Dale and Stockton.

PALMYRA, N. Y.—The Wayne-Monroe Telephone Company is to enlarge its plant at Palmyra.

ASHEVILLE, N. C.—The Asheville Telephone Company is making many improvements in its system.

IREDELL, N. C.—The Iredell Telephone Company will begin the construction of its system as soon as the necessary supplies are procured.

CADIZ, O.—The Harrison County Telephone Company is extending its lines in Cadiz.

DANVILLE, O.—The Citizens Telephone Company is extending its lines.

NEW CARLISLE, O.—The Home Telephone Company is installing its system at New Carlisle, O.

LEETONIA, O.—The Salem Township Rural Telephone Company is to build lines west of Leetonia.

NEW SPRINGFIELD, O.—The Beaver County Telephone Company is building a line between New Springfield, O., and North Lima.

SIDNEY, O.—The Sidney Telephone Company is making many improvements in its system.

TAPPAN, O.—The Tappan Telephone Exchange is to install a new switchboard and is also to make other improvements in its system.

CONESTOGA, PA.—The Conestoga Telephone and Telegraph Company is building a line from Stonersville to Amityville.

HOPE VALLEY, R. I.—The Hope Valley Telephone Company is building a line from Hope Valley to Canonchet.

RAPID CITY, S. D.—The Black Hills Telephone Company is to repair and enlarge its entire system at Rapid City.

LA SAL, UTAH.—The La Sal Mt. Telephone & Electric Company is to extend its lines to the Wilson Mesa Placer Camp.

ENTERPRISE, W. VA.—The Enterprise Telephone Company contemplates installing an exchange at Middlebourne.

BRODHEAD, WIS.—The Brodhead Telephone Company is extending its lines.

HILLSBORO, TEXAS.—The Independent Telephone Company is to extend its underground work in Hillsboro, Texas.

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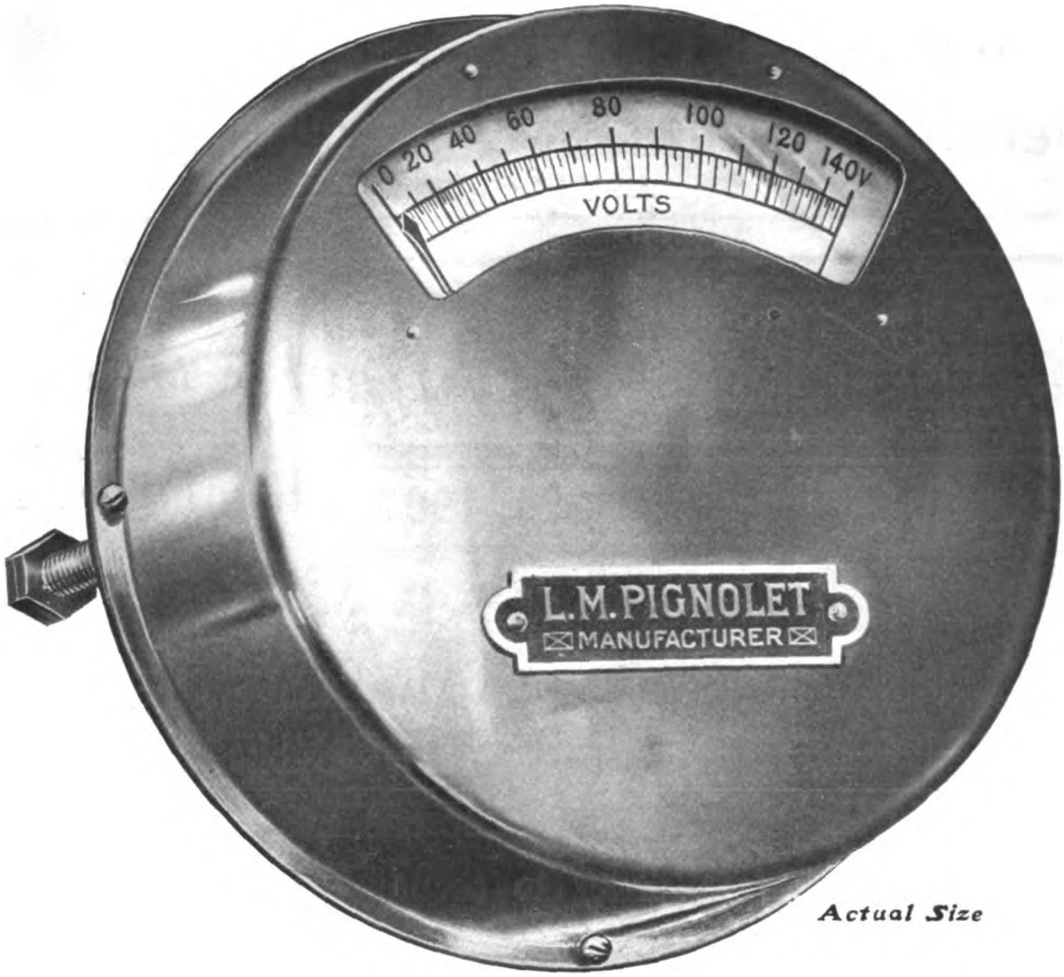

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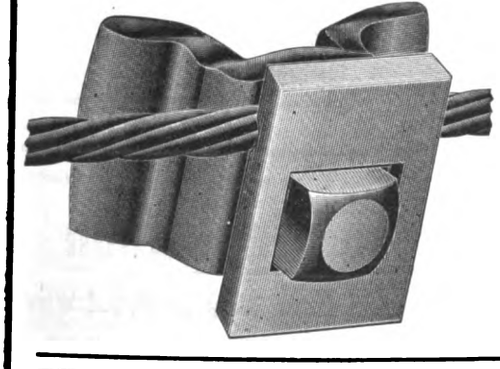

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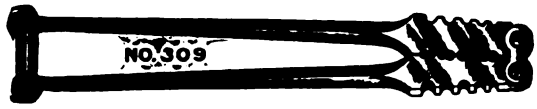

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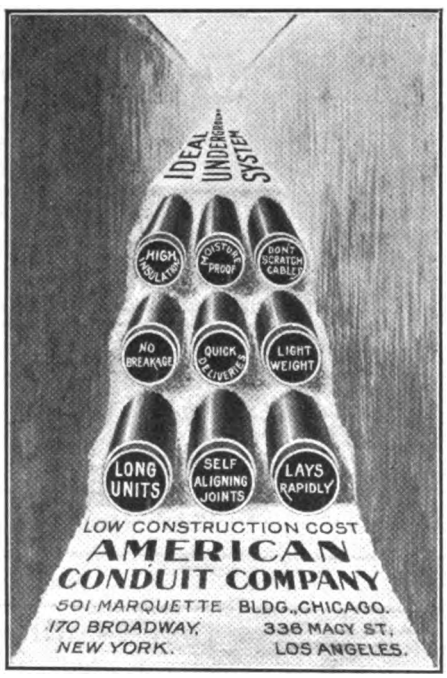

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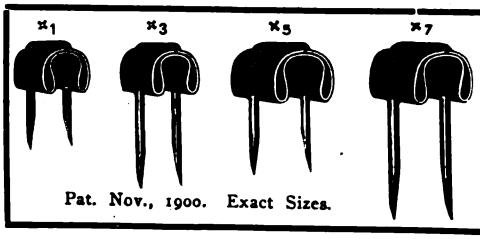

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Blake Insulated Staples
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Manufactured and For Sale by
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246 Summer St., Boston, Mass.

Exact size. Pat. App. for.

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TRADE MARK
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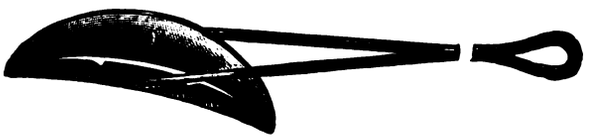
"They Never Pull Up"

THE MILLER SAFETY ANCHOR



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Copper and German Silver Magnet Wire
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OUR 1906 CATALOG WILL BE SENT ON REQUEST

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194 MICHIGAN STREET
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REPEAT ORDERS.

Nearly four years ago a prominent telephone company placed its first order for a Gould Storage Battery. The installation proved so completely satisfactory that six additional exchanges of this company were subsequently equipped with Gould Batteries. Frequent repeat orders like these from telephone companies throughout the country are *proof positive* of the satisfaction and economy of the Gould Storage Battery.

Full particulars and prices upon request.

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Type SW Terminal. No pothead necessary. Equipped with carbons and tubular fuses.

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POLE CABLE TERMINALS AND JUNCTION BOXES

FOR

Multiple Tap Cable Distribution

Cook's Terminals furnish the most approved forms of protection, and the best and simplest means of cable distribution.

Cook's Junction boxes are best for cable splicing. They can be used in conjunction with the terminals or alone. At points where you desire to dead-end your cable use Cook's Junction Box. You can add a cable Terminal later if you wish.

SELF SOLDERING NOZZLES
Are Furnished With Both Terminals and Boxes

WRITE FOR PLAN FOR YOUR CABLE LAY-OUT

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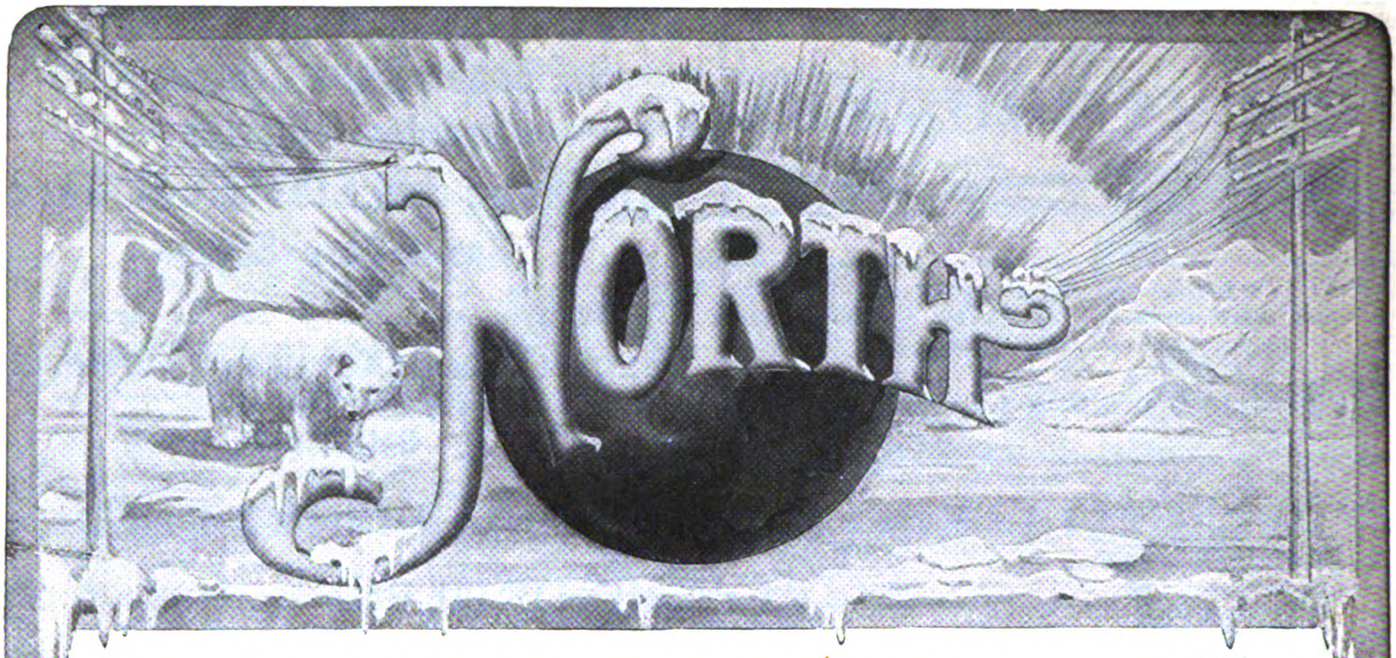
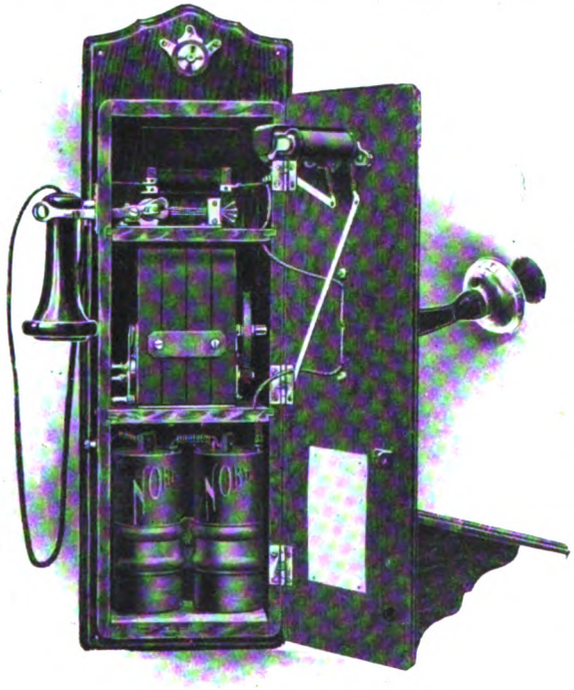


North Magneto Telephones



North's compact telephone—Type K—for exchange and rural service, has a wide popularity which it well deserves. We have been selling many thousands of these annually and our sales continue to increase.

These telephones are built for service—continuous and efficient. The first thought in designing them has been to produce a first-class, durable instrument, wherein the item of repairs and attention after installing has been reduced to the minimum. To produce this result requires the best design, material and workmanship that can be had.

You can increase the popularity of your service and decrease your expenses with this telephone.

KANSAS CITY **CLEVELAND** DALLAS

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CENTURY
100 % GOOD

DOLLARS FOR YOU!

You operate your telephone system for profit.
You wish the profits were larger.
How to make them so puzzles you.

THERE'S A WAY

Cut down your maintenance cost.

This can be done by using telephone equipment, the development of which is the result of many years' practical exchange operation.

We have constructed and operated a large number of exchanges.

Our profits were increased by putting only the very best of material and workmanship into our apparatus.

Because our trouble bills were smaller.

Yours will be also.

We can prove to you that we can increase the earning capacity of your exchange system.

WRITE US TO-DAY

You will find it to your advantage to know about our complete line of local and common battery telephone equipment.

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MONARCH

THE reputation of Monarch transmitters and receivers has been secured by five years of successful operation. The transmitter not only excels in talking qualities, but has the additional advantage of being cheap to operate. Accurate and extensive tests show that the Monarch transmitter can be operated on one-half the amount of current required to satisfactorily operate other makes. This feature is certainly a valuable one.

The construction of the Monarch receiver is such that satisfactory results are a natural consequence. It is a well made receiver worthy to be the companion piece of the Monarch transmitter. The mounting of the coils is a unique feature and one which is appreciated, as either or both coils can be readily removed, repaired or interchanged.

Monarch Telephone Mfg. Co.
CHICAGO, U.S.A.

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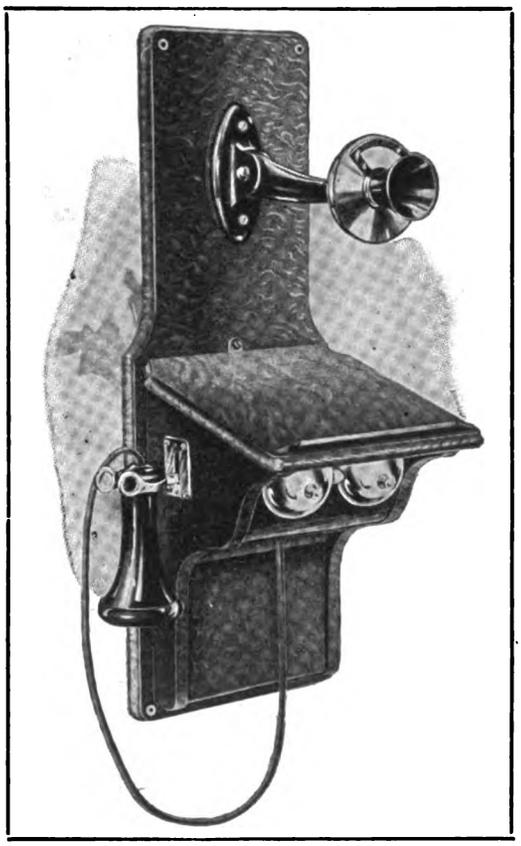
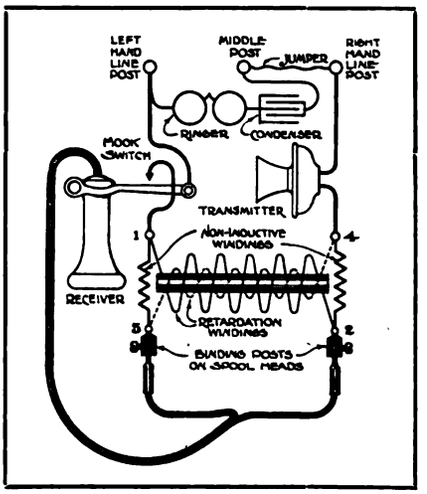
DEAN TELEPHONE APPARATUS

OUR COMMON BATTERY TELEPHONES

We show in the accompanying illustrations our COMMON BATTERY BUSINESS TYPE TELEPHONE, and the most efficient TALKING CIRCUIT ever devised, which is used exclusively in all of our common battery telephones.





This circuit consists of our celebrated coil, employing the principle of the balanced Wheatstone bridge, which keeps the direct current flow from the receiver, while the voice current which is alternating in effect is received at maximum value, thus with the Dean transmitter and receiver the service received is of the highest efficiency. The condenser performs but one function, that of preventing the direct current from flowing in the ringer circuit.

Our New Bulletin No. 102-A on Common Battery Telephones, giving descriptions and circuits from the early forms of common battery to those used in modern telephony, will be mailed to you for the asking

BRANCH OFFICES

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Kansas City, Mo.

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FACTORY AND GENERAL OFFICE
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THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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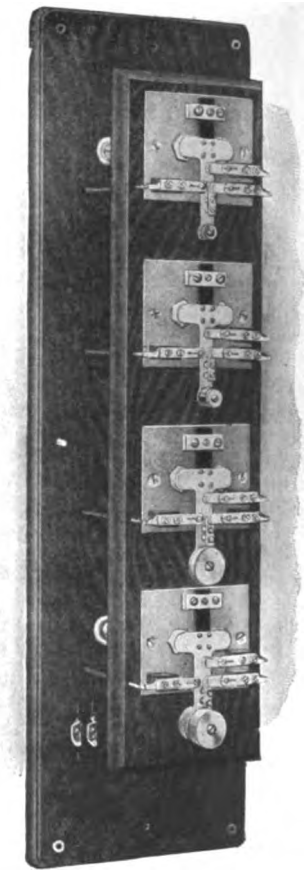
KELLOGG

FREQUENCY POLE CHANGER

Utmost SIMPLICITY of operation

THIS POLE CHANGER can be used on common battery or magneto exchanges.



"POLE CHANGER" COVER REMOVED

Advantages:

1. Requires very little attention after once set up and put in working condition.
2. The tuned vibrating reeds are absolutely adjusted and will not depart from their regular periodicity.
3. Operates from Primary or Storage Batteries.
4. They can be operated from the regular storage battery of the exchange without affecting the talking circuits.
5. Operates successfully on any standard voltage of a telephone exchange.
6. Practically noiseless in operation.
7. Only THREE contacts on each Vibrator.
8. The vibrators have a very long spring, hence they will not break or change the frequency.

THE TRANSFORMER CABINET contains all necessary Switches, Fuses, etc.
Pole changer cabinet and transformer cabinet separate.
Can be put in different rooms if desired.
Sold separately or complete.
No additional apparatus needed on power board already installed.

TRANSFORMER CABINET

Send for "Folder No. 3 A" *Correspondence Solicited*

KELLOGG SWITCHBOARD & SUPPLY CO.,

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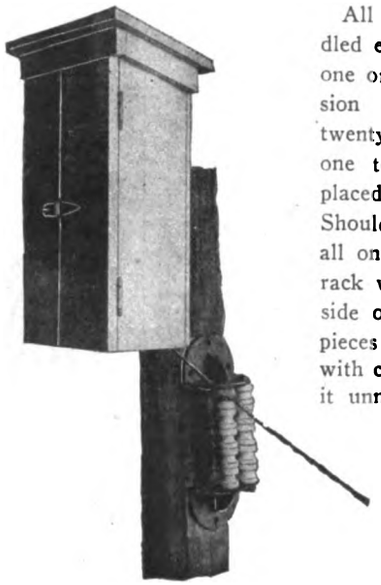
Robinson Pole Distribution Rack

(PATENT PENDING)

SIMPLE INEXPENSIVE PRACTICAL

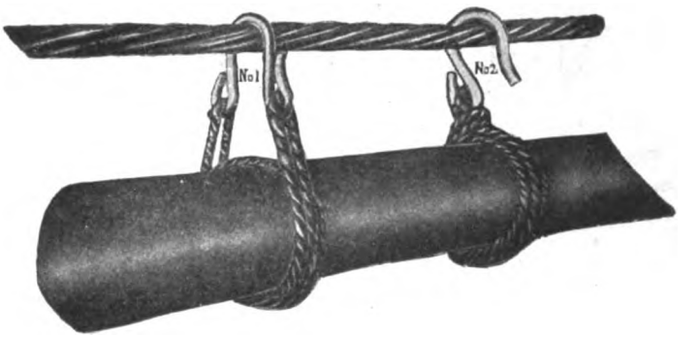


All drops can be easily handled either by placing rack on one or both sides as the occasion demands. In case of twenty drops equally divided, one ten pair rack would be placed on each side of pole. Should the twenty drops be all on one side, a twenty pair rack would be placed on that side of pole. Top and lower pieces heavy malleable castings with convexed surface, making it unnecessary to gain pole.

Send for Catalog No. 8 of Nagel Specialties

Swisher Marline Cable Hanger

(PATENT APPLIED FOR)

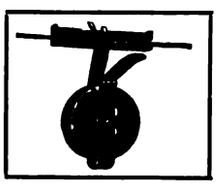


In the above illustration we show in figure No. 1 the Swisher Marline Hanger, in figure No. 2 the old style now in common use. The advantages we claim for the Swisher Hanger are: First, easy to install. Second, greater strength. Third, hook cannot become detached from strand. Fourth, hook cannot straighten under strain and let cable down. Fifth, in stringing of wires over cable, wires sagging will not catch under hook as in old style. Sixth, after cable has been installed, same can be pulled without opening the hooks.

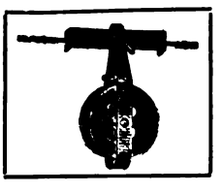
We use only the best grades of marline and No. 9 hooks galvanized after forming. Our No. 9 hook on account of its construction will stand a greater strain than a No. 6 hook of old style.

The W. G. NAGEL ELECTRIC CO., 26-30 St. Clair Street TOLEDO, OHIO

All Sorts of Schemes



have been suggested for stringing cables, but nothing found



so good as our effective

Security Trolleys

We find the best wheel for this purpose is malleable iron, yet the weight of our trolley is only twelve pounds. They stand exposure and abuse, and will not chip. Wood wheels, however, if you wish, at same price.

Security Trolleys are made on scientific lines throughout, but are rugged; easily put up and taken down. Two men can pull a thousand feet of cable in ten minutes with ease after the trolleys are in place—a matter of half an hour.

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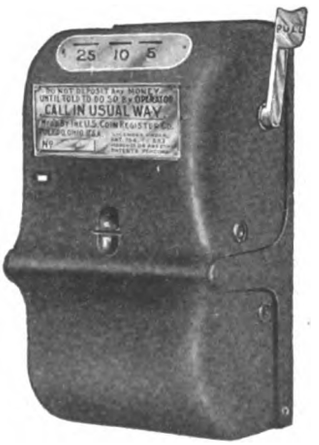
Cash Register and Pay Station

THE BEST TELEPHONE SERVICE



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A cash ticket with every collection.

A tape numbered from 1 to 2,000 does the work.

Cash always accounted for.

No Errors,

No Disputes,

No Trouble.

It protects both patron and company.

It keeps collections right.

It makes you money.

Write at once for particulars and catalogue.

THE United States Coin Register Co. TOLEDO, OHIO

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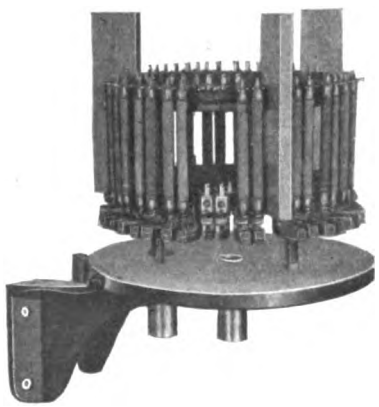
A NEW ONE SECTIONAL CAN TOP

NO. 260



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Made in All Sizes From 10 Pair Up

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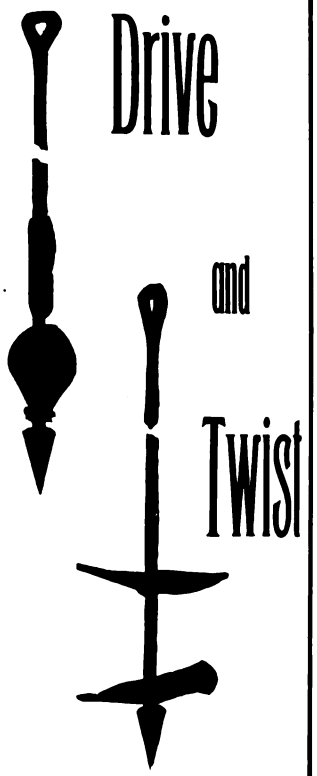

QUICKLY SET

Designed so as to be easily driven.

When anchor is twisted the blades open and grip hard, unbroken ground.

Quickly installed in stony localities where digging is difficult.

Will hold anywhere.

Write for New Catalogue

THE D. & T. ANCHOR CO.

LA CROSSE, WIS.

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A Trial Will Convince Everyone

of the superiority of our apparatus

Battle Creek, Neb., May 12, 1906.

Gents:—You will find endorsed draft for $141.72 and I must say your telephones are the best we can get. If you keep them up where they are now, they certainly will get the business. A trial will certainly convince every one that knows what a good 'phone is.

I remain, W. B. FUERST, Mgr.

An Investigation

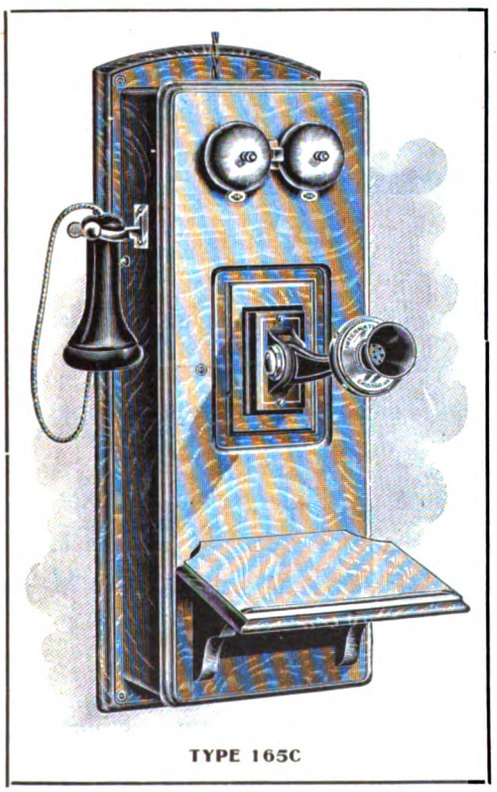
can only have one result. We are growing right along and increasing our output. This is occasioned by the increasing demand for our product. *Why,* simply because the customer is pleased and gratified with results obtained. And, as Mr. Fuerst states in above letter, a trial will convince every one that knows what a good 'phone is. We solicit an opportunity to convince you. Good business judgment should at least prompt you to investigate.

ADDRESS NEAREST OFFICE

Swedish-American Telephone Co.

CHICAGO, ILL.

Branches { 115 West 6th Street, Kansas City, Mo.
615 Bee Building, Omaha, Neb.
112 Broadway, Fargo, N. DaKota



TYPE 165C

$—2—U

If you want a telephone that you can put out on your rural party line and give absolutely the best service and one that will save you many a long expensive drive out into the country, get the

International

All connecting wires, binding posts and terminal screws fully concealed, preventing these parts accidentally becoming disconnected.

No exposed metal parts in the circuit, avoiding danger from lightning while using the instrument.

We Will Send You One On 30 Days Approval

INTERNATIONAL TELEPHONE MFG. CO., HARRISON & CLINTON STS. CHICAGO

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STROMBERG-CARLSON

TELEPHONE MANUFACTURING COMPANY

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Manufacturers of

TELEPHONE APPARATUS

of the

HIGHEST GRADE

For All Glasses of Service

Including City, Town and Village Exchanges, also Rural Party Lines.

Complete Equipment for Steam, Electric and Interurban Railways.

Private Exchange Telephone Systems for Hotels, Large Manufacturing Plants and Institutions.

Intercommunicating Systems for Smaller Business Houses and Individuals.

Mining Properties equipped complete with specially designed apparatus.

Switchboards and Telephones of every description for Central Energy and Magneto Systems.

Lead Covered Cable for Underground and Aerial Use, Cords, Insulated Wire and a Large and Complete Line of Telephone Construction Material always on hand.

WRITE FOR BULLETINS ON THE CLASS OF APPARATUS YOU ARE INTERESTED IN. THEY WILL BE MAILED PROMPTLY FREE OF CHARGE BY MENTIONING THIS "AD" B. :: :: :: :: :: :: :: :: :: :: :: :: ::

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WE MAKE CABLE

750 HORSE POWER

in a building 313x175 feet. This new addition to our plant will enable us to continue to fill orders for cable with the usual promptness. The new structure is to be one story in height and will have a saw-toothed roof which will correspond with our other buildings and insure light and air. The new 750 h. p. Hamilton-Corliss engine will be direct connected to a 500 K.W. generator. For the 2 extra boilers required we have erected another stack or chimney equal in size to our present stack.

The reliability of our product explains our rapid growth. In spite of the increased output we have continued to conduct every step in the manufacture of

Stromberg-Carlson Cables

with the greatest care. We have more than quadrupled our plant in two years—that means that we have made good cable. We are still making good cable, but we are making more of it. Let us send you our book telling about cable. Write for it to-day.

Ask for Booklet 79-B

STROMBERG-CARLSON TELEPHONE MFG'CO.
ROCHESTER., N.Y. CHICAGO., ILL.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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IF

there were only one or two reasons why operating telephone companies should use the POOLE PARTY-LINE LOCK-OUT SYSTEM, we wouldn't make them, but there are several.

The Lock-Out feature for party lines is more important than selective signalling.

From the subscriber's standpoint selective signalling is used to eliminate annoyance from ringing of bells when other parties on the same line are called, and not notify all parties when one party is called. What does "A" care if "B" is in the same business, on the same party-line and knows "A's" ring. "A" knows absolutely that "B" can't hear his conversation because his party-line is equipped with the POOLE Lock-Out System.

Put it up to the subscriber, and after explaining both selective signalling and POOLE Lock-Out to him, give him his choice. He will select Lock-Out because SECRECY is of MORE IMPORTANCE to him than annoyance from bells.

Both features are very desirable on party lines, but the Lock-Out is most desirable.

And, Mr. Manager, we can prove to you that your OPERATING EXPENSES ARE REDUCED by the use of our Lock-Out System.

Operators handle greater number of lines.

No Central Office equipment required; it is merely an attachment to the subscriber's instrument.

Works on ANY make of Central Energy telephone with any straight or selective signalling system. Simplicity is its crowning feature.

Write for more reasons why. Ask for Booklet—"POOLE LOCK-OUT SYSTEM."

MANUFACTURED BY

The Mountain State Electrical Company

No. 911 MARKET STREET **WHEELING, W. VA.**

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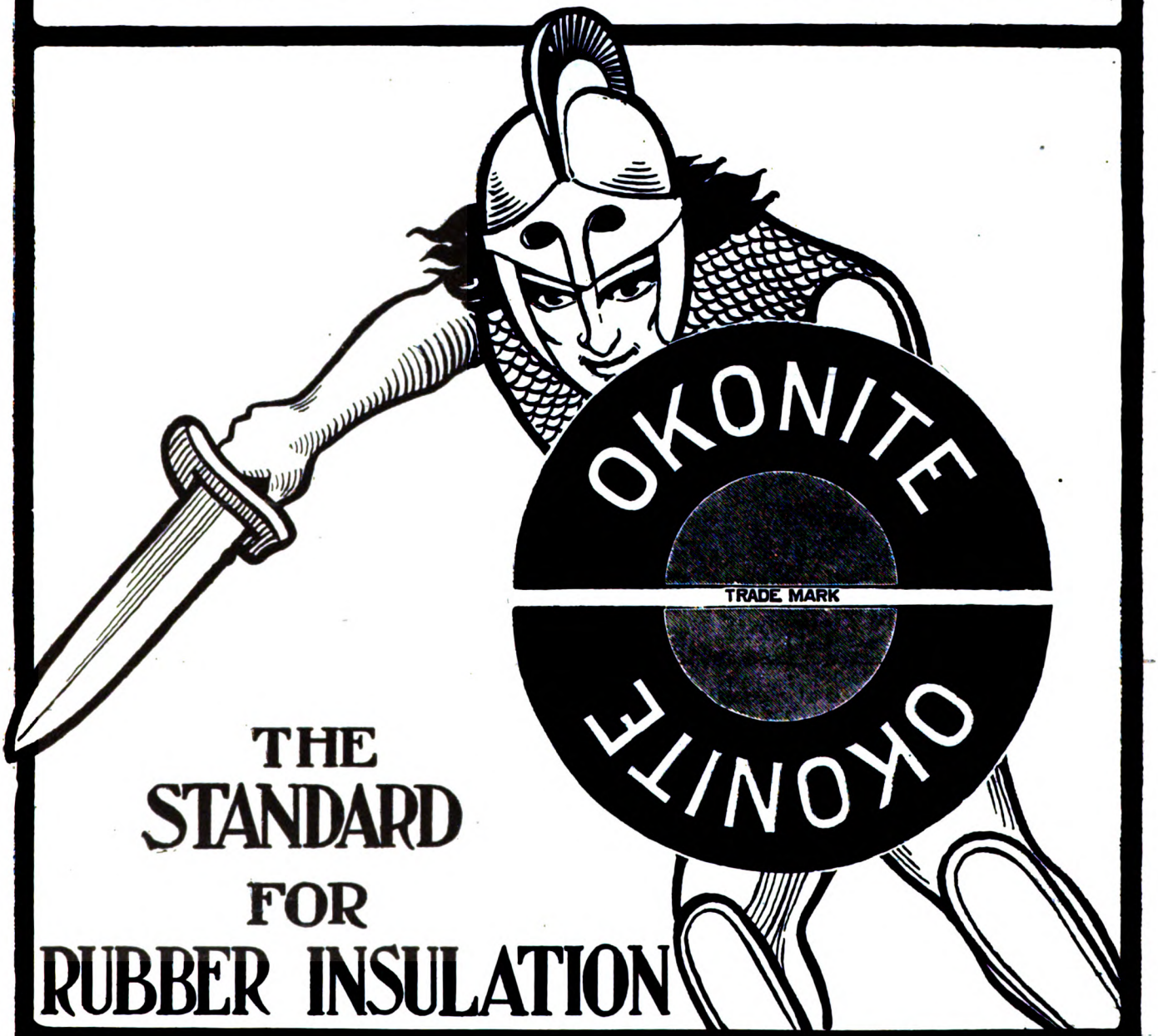

THE STANDARD FOR RUBBER INSULATION

The OKONITE COMPANY *Ltd*

Manufacturers of Insulated Wires and Cables

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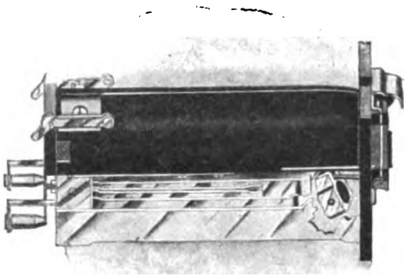
WERE YOU AT THE CONVENTION?

If Not, You Missed Seeing One of the Best Things There--

OUR "PRIMO" SWITCHBOARD

But here is a case where opportunity knocks **twice** at every man's door, for if you missed the **first** opportunity, we offer you a **second, now.** Only a **fraction** of the **good** points in this latest and best type of board are given here.

Note.—**Solid** construction—no **skimping** of material to **save** on **cost.** Substantial **throughout** and of the **best material. Fewer** working parts than **any** similar type of board **made.** A **simple, positive** restoring feature with **minimum** number of parts —successfully **used** for **four** years. Front mounting plate for five drops each **heavily** insulated with **best rubber** on **both** sides and **heavily bushed** with hard rubber at **all** screw holes—**impossible** to short-circuit **any** of the connections. Jack frame **entirely separate** from line drop signal—**impossible** to **jar loose** or cause **racking** in **any** portion of the board. **Mica** insulation **between** springs, **best** hard rubber insulation **elsewhere.** Springs of **heavy gauge** German silver with **platinum** insertions. **Four** springs to the jack, cutting out **both** sides of the circuit on insertion of the plug.



No screws pass **through** jack springs—**no chance** for **short-circuit.** Jack springs set **perpendicularly**—**no dust** can gather on **contact points.** Tube and coil **longer** than in **any** other **type** of board, which with the fact that **no portion** of the **armature** is **cut away,** makes the drop **most sensitive** to magnetic influence. Armature **removable** without the loosening of **any screws** or **changing** of **adjustment**—the work of a **second.** Coil **removable** in the twinkling of an eye—**see cut. No** connections to **unsolder.** Cable **permanently** soldered **direct** to springs—**no loose** connections in the **talking** circuit. **Protected** shutter release—**no possibility** of **knocking** down the shutters. **Raised metal** numbers that **do not wear off. Positive** night bell circuit with **double** contact springs—**never fails** to operate.

Are these not **enough** reasons why **you** should purchase **this** board? There are **more.** We have a **new** table key and other parts. These boards are made in **all** standard sizes. **Prices** and further **data** on **request.** Write **now.**

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Allentown, Pa.	Columbus, Ohio.	Lake Benton, Minn.	Pentwater, Mich.	Tacoma, Wash.
Auburn, Maine.	Dayton, Ohio.	Lewiston, Me.	Perry, N. Y.	Toronto Junction, Canada.
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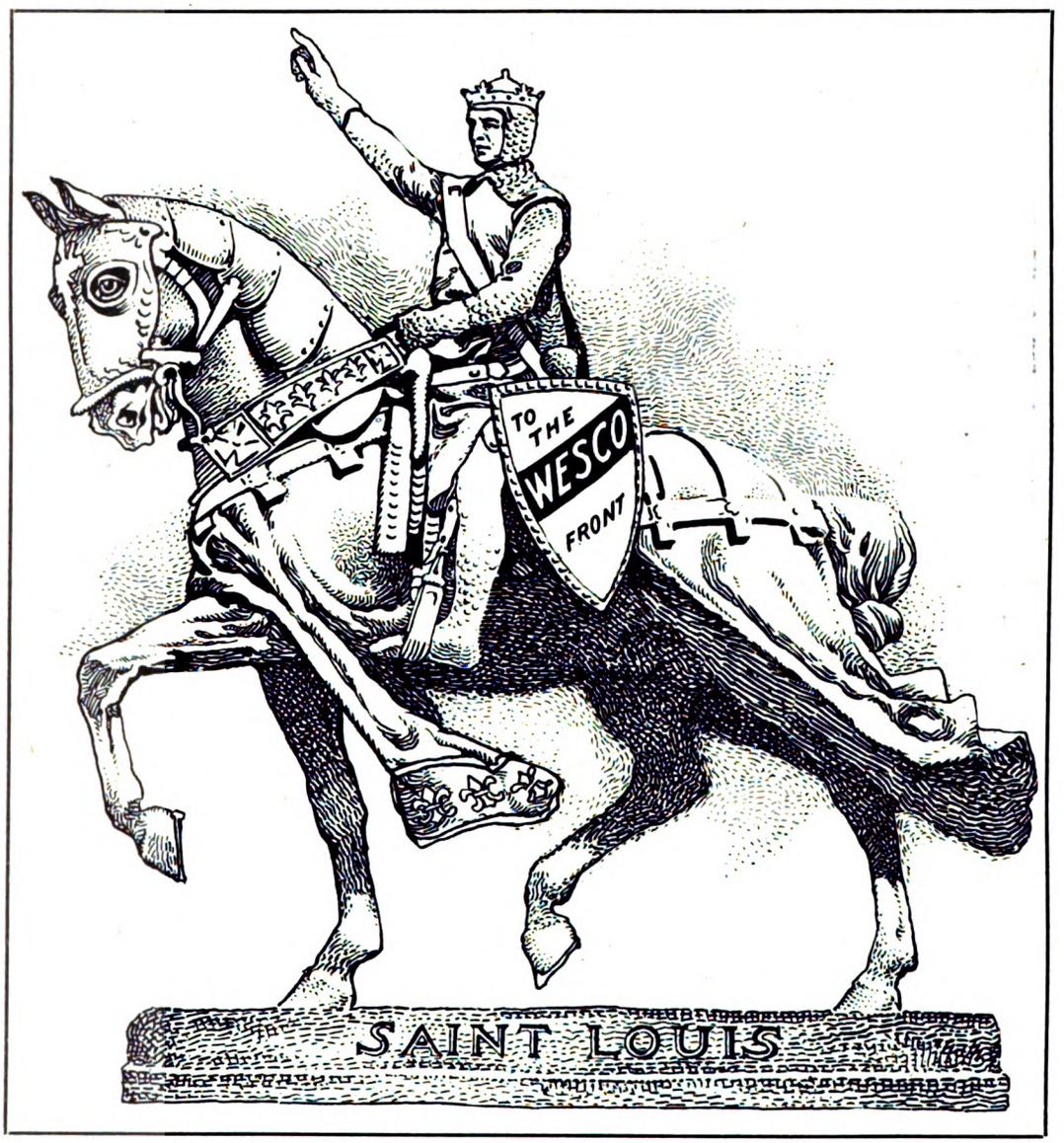

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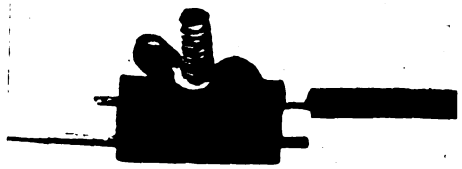

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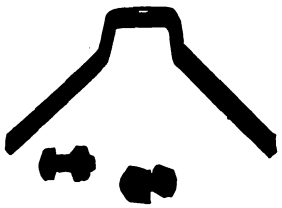

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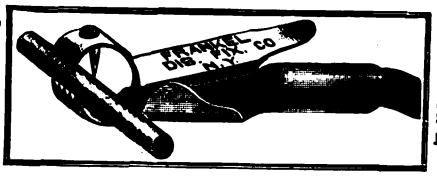

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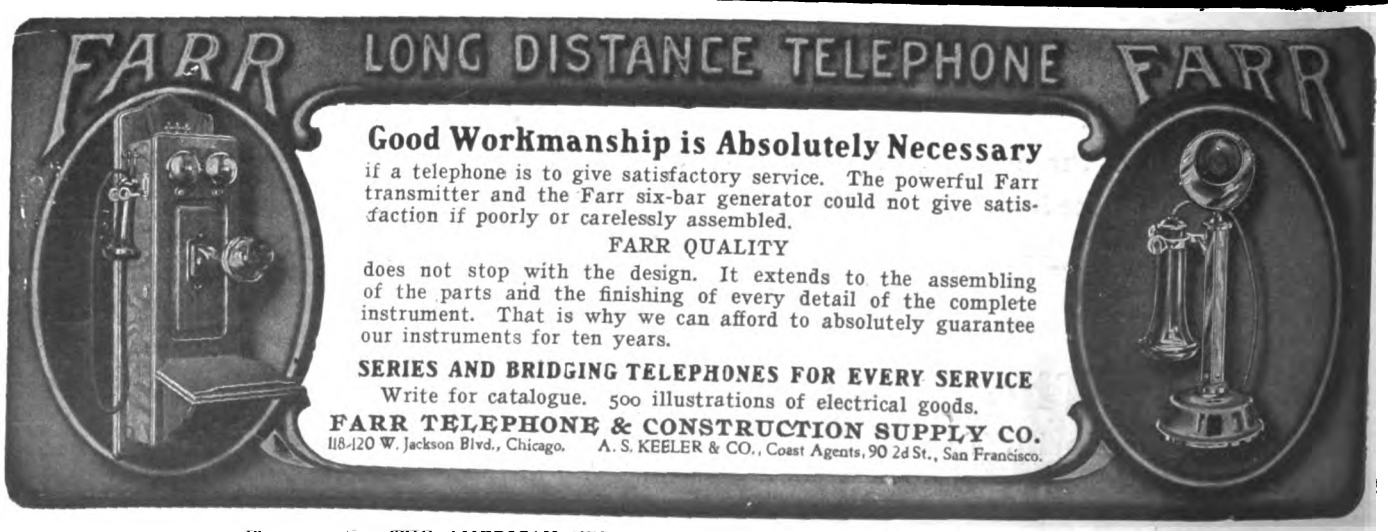

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VOLUME XIII *SATURDAY, JUNE 30, 1906* *NUMBER 26*

Proceedings at the Convention

THE annual convention of the National-Interstate Telephone Association was held as usual at the Auditorium Hotel, beginning Monday, June 25, and closing June 28. Monday was devoted to the meetings of various committees and of the executive council. The deliberations of the convention proper began Tuesday afternoon, shortly after two o'clock.

Before the meeting was called to order by President James B. Hoge of Cleveland, Ohio, it was evident that the largest and most successful convention in the history of Independent telephony was about to sit. The banquet room of the hotel in which the meetings have been held year after year was filled to overflowing with enthusiastic delegates from all parts of the country.

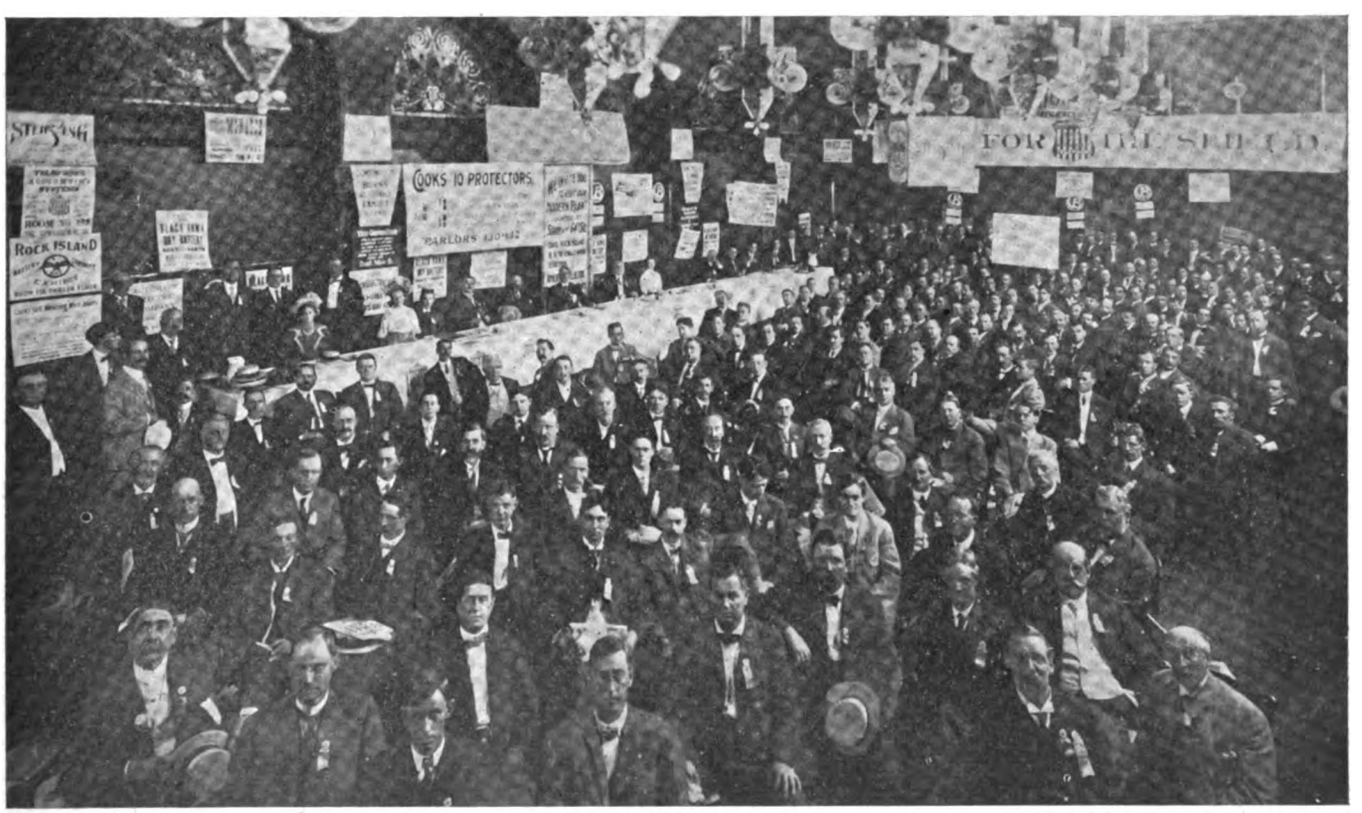
Hon. Edward F. Dunne, Mayor of Chicago, was to have delivered the customary address of welcome. Unexpected events, occurring the day before the convention, prevented his attendance, greatly to the regret of the assembled delegates. He, however, furnished a welcome substitute in the person of Chicago's famous corporation counsel, Hon. J. Hamilton Lewis.

Mr. Lewis first called the convention's attention to the presence of a distinguished gentleman from New York, Hon. Martin W. Littleton, who, he declared, had once defeated him in debate, for which he now proposed to get even. A most eloquent address of welcome followed, the best which it has been the good fortune of the association to hear. Mr. Lewis is far-famed as an orator, and on this occasion his evident sympathy with his subject lent additional force and beauty to his remarks.

He began by expressing the regret of the mayor that he was unable to be present. It had been his desire from the first to welcome the convention in person, as the meeting typified a purpose to which he had devoted a great part of his life. After expressing his own sympathy with the movement, Mr. Lewis said that the association could not have chosen a city more appropriate to its purposes and work than Chicago. No city had so incessantly warred against monopoly as had Chicago. Yet she was in the grasp of a most relentless monopoly which if permitted would interfere with her manifest destiny. No monopoly existed to-day more relentless and more grasping than the telephone monopoly. But he was glad to say that at last the gates of Chicago were open to those who would enter and offer some relief through honest competition.

When after a most beautiful peroration the speaker welcomed as Chicago's guests the assembled delegates, the convention was loath to let him go and applauded loud and long after he had taken his seat. Again when, after the responding address, Mr. Lewis tried to pass unnoticed out of the room, the delegates gave him another round of applause.

The response was made by E. H. Moulton, president of the Tri-State Telephone Company of Minneapolis and St. Paul.



Delegates to the Convention of the National-Interstate Telephone Association at Chicago, June 26th.

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Theodore Gary, Representative from Missouri, Re-elected Vice-President.

E. B. Fisher, of Grand Rapids, Who Took a Prominent Part in the Proceedings.

J. B. Ware, One of the Leaders in Michigan's Independent Development.

Mr. Moulton gracefully replied to the expressions of hospitality and closed by calling Chicago's attention to the fact that the number of Independent telephones in the country tributary to Chicago is conservatively placed at 1,250,000, fully double the number operated by the Bell company in the same territory, and that nearly all the great Independent factories, employing 5,000 men, are located in the city.

The annual address of the president followed. Mr. Hoge referred to the great work which has been accomplished through the office which the executive committee had instructed him to open at Cleveland. In order that the Independents of the country might be kept informed of the progress of the work, monthly bulletins have been sent to the various telephone journals and magazines. These periodicals have in addition published various articles prepared by friends and officers of the association. The past year was a red letter year for the association. The National plans for organization have been adopted in twenty-two States and the benefits resulting from such a compact organization had been very great. The "shield" is being used by most of the leading companies in forty-one States, and the public everywhere is beginning to recognize it as the emblem of the movement which has increased the telephones in use from 300,000 to over 5,000,000, of which 3,000,000 are connected with Independent systems. He predicted that the next three years would see 3,000,000 more Independent telephones added. He called attention to the need for a better and stronger organization and a campaign of publicity to give complete information concerning the greatest industry in the country. The president closed by acknowledging the honor which had been paid him and by expressing his thanks.

The Chair announced that it had been planned to make the question box an important factor in the deliberations of the convention and that the box would be in charge of Mr. Gary, of Missouri, Mr. West, of Pennsylvania, and Mr. Rhodes, of Ohio.

The following committees were appointed:

Ways and Means—J. G. Splane, of Pennsylvania; R. B. McPherson, of Michigan; Henry Barnhart, of Indiana; J. S. Brailey, Jr., of Ohio; Charles E. Sumner, of Oregon.

Amendments to Constitution—Senator Kline, of Pennsylvania; Cyrus Huling, of Ohio; J. B. Ware, of Michigan; J. B. Earle, of Texas; E. R. Conklin, of Illinois.

Nominations—E. H. Moulton, Minnesota; O. C. Snider, of Missouri; M. B. Overly, of Kentucky; W. Gilbert Thompson, of Ohio; P. C. Holdoegel, of Iowa.

Photographs—George T. Hewes, of Iowa; R. E. Mattison, of Nebraska; Wm. L. Moellering, of Indiana.

Credentials—A. C. Davis, of West Virginia; Lewis Brucker, of Ohio; A. C. Lindemuth, of Indiana; Linton Reber, of Ohio; Louis Beaukenhorn, of California.

Entertainment—C. W. Stiger, J. G. Ihmsen, E. B. Overshiner, J. F. Cracraft, W. H. McDonough, W. W. Dean, C. D. Newton, H. B. McMeal, F. M. Bailey, C. Y. McVey and George N. Bandy.

In his report Assistant Secretary J. A. Harney gave an account of what was being accomplished in the national office opened by the executive committee at Cleveland, Ohio. The first thing attempted was to get a complete card system record of every Independent company in the country, together with the towns and cities operated, etc. According to this record, which is as complete as it has been possible to get the information, there are 7,550 Independent telephone companies in the United States, operating in 12,125 cities and towns. Making due allowance for Bell companies posing as Independents, there are at a conservative estimate not less than 7,400 Independent companies, operating in not less than 11,125 cities and towns. All data secured has been indexed, and monthly bulletins have been sent out to telephone journals and officers of State associations to keep them in touch with the situation. There is a substantial balance in the treasury. The supply department has been run at an actual profit.

Mr. Harney explained that it was not the intention of the supply department to enter into competition with firms supplying telephone apparatus and supplies, but merely to help the Independent companies in advertising their business by means of the shield emblem. He said the business of supplying emblems, etc., had not been intended as a profit making undertaking. By buying in large quantities the association was able, however, to sell the companies very reasonably and also show a small profit which helped defray the expenses of carrying on the work.

The shield, he reported, is being displayed in some forty-four States. The work of mapping the Independent field has been prosecuted with such vigor that already 920 separate maps have been submitted, and several State maps completed. A clipping bureau has been patronized and the newspaper articles adverse to Independent telephony have been investigated. In nearly every case the statements have been found to be false and misleading. Letters and telegrams indorsing a competing telephone system have been secured from prominent men and such like data used to assist Independent companies to obtain franchises. The secretary closed by urging the members to comply promptly with every request for data in order that the work might be economically carried on and the results made quickly available.

In lieu of the report of the secretary, A. L. Têtu, a letter from Mr. Têtu was read, in which he expressed regrets that he should not be able to attend the convention, at least on the opening days, on account of sickness in his family.

The convention adjourned until ten o'clock Wednesday morning.

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Southern Toll Lines and Exchange Development*

By L. G. Parker.

THE section commonly known as "The South" is the group of ten States lying east of the Mississippi River and south of the Ohio. It embraces the Virginias, the Carolinas, Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi and Louisiana.

What are most commonly known, however, are the immense resources of this small area, the dominant part that it is now playing in our Nation's work, and the almost absolute certainty that it will be inside of twenty years the central and controlling factor of the productive, manufacturing and business enterprise of the United States.

And these are the reasons:

These States contain one-fourth of our population; they have one-third of all our coal lands with thickness of vein and quality of product that make the deposits in the balance of the country appear insignificant. One little State, West Virginia, has more coal than Great Britain and Germany combined, and its quality is famous the country over; this old South contains one-half of all the standing timber in our domain, being the principal source for the valuable hard woods, white oak and walnut; it contains more iron ore than all the balance of our land. The Birmingham district in Alabama alone has inexhaustible quantities; it now produces three-fourths of the cotton supply of the entire world, and if necessity demands it can produce three times as much as the world now uses.

Most important of all, our countrymen in these States have no superiors on earth. Hospitality and fair dealing are placed above dollars and deceit. Courtesy and kindness stand before selfishness and ill will. There live men and women who are fearless, brave and true. In them lie strength for the Nation and from their ideals will come far-reaching forces for cleanliness and honor in the business world.

While the Northern, Eastern and Western States have been crowding forward in the past twenty years, engrossed by what seemed to them their unequalled advance in fortunes, the fact has been generally overlooked that their sister States in the South have been doing a substantial thing or two themselves, and true to their code, have been saying little about it.

It has been estimated that the loss to this district in the strife of the early 60's amounted in men and means to over $8,000,000,000—more than eight times our National debt. The true meaning of this may be obtained if one stops to think that the Japanese Nation with its 50,000,000 inhabitants was practically exhausted by the expenditure of only $1,000,000,000 in their recent war with Russia—lasting only one year.

In addition to recovering from this staggering load the South has erected mills that now spin one-half of all the cotton used in this country; has built furnaces and rolling mills that turn out more iron and steel than was produced by the entire Nation twenty years ago, and has sprinkled the land over with factories of all kinds.

This has been due to the riches that nature has showered upon this country as apparently it has given to no other. After furnishing its full proportion of staple crops on which the Nation feeds—and drinks; after this vast garden spot has furnished the sister States with its berries, fruits and vegetables, the South this year, as in the past, will take from its soil to place in its pocket, $40,000,000 in iron, $40,000,000 in tobacco, $90,000,000 in coal, $250,000,000 in timber, $440,000,000 in cotton, or a total of $860,000,000 for one year. This is the value of its raw material ready for shipment, and, bear in mind, is entirely over and above the prodigious output of pure farm products that in themselves equal what other States are doing, $1,300,000,000 annually outside of cotton and tobacco.

These things have been recited for the sole purpose of giving you the proper setting for the next view.

These States have a population of nineteen and one-half million of people. They have only about 135,000 Independent telephones or one to every 145 inhabitants. Do you see now the possibilities in the telephone field in that section, what is bound to come, and the fortunes that will be made in this field?

And now for the existing conditions. From the best information available, the Independent telephone movement really started in 1895, by the building of an exchange in Knoxville, Tenn. At the same time one was being constructed at Owensboro, Ky., which went into service in 1896. The instability of financial conditions in the two or three years following prevented much further development, although here and there a few exchanges were started under adverse conditions. Henderson, Kentucky, was built in 1897 and '98 with the second central energy system installed in the United States by Independents, the first having gone in at Battle Creek, Michigan. Maysville, Kentucky, on the Ohio River also sprouted a plant. Small mutual concerns of fifteen or twenty telephones also took root.

But in 1899 the real work began. At the present time out of 75 cities in this section having 7,000 inhabitants, 37 are equipped with Independent exchanges of modern construction and are in successful earning condition. Among them are Louisville, Lexington, Paducah, Owensboro and Frankfort in Kentucky; Memphis, Knoxville, Clarksville and Jackson in Tennessee; Savannah, Columbus and Atlanta in Georgia; Birmingham, Bessemer and Mobile in Alabama; Meridian in Mississippi; Shreveport in Louisiana; Tampa in Florida; Wheeling, Huntington, Parkersburg and Charleston in West Virginia; Norfolk, Newport News and Roanoke in Virginia; Raleigh and Concord in North Carolina.

In West Virginia every other city is equipped. They have done good work. In Kentucky, every city is built except Newport and Covington, which really form a part of Cincinnati. In Tennessee only two cities are groping in the darkness—Nashville and Chattanooga.

This makes an ideal condition for long distance operations. In the Middle and Western States the small towns were built before the cities and the long distance struggled for quite a long time cut off from entrance into the seats of power and wealth. In the South, the cities largely are built and are crying for outside connections. A few of them, absolutely unable to withstand the strain, were forced to give their subscribers a connection with the other system, but fortunately they are few. The people are heartily supporting the home companies wherever installed and are patiently waiting their deliverance by long distance lines. And their deliverance is near at hand.

While Parkersburg and Wheeling have toll lines into their tributary towns, Wheeling has also a fine line to Pittsburg, Charleston and Huntington are connected, and a corporation of adequate size and scope is now operating and building to give the South the necessary facilities.

The Central Home Telephone Company of Louisville has in active operation throughout Kentucky and southern Indiana about 700 miles of pole line connected with the New Long Distance Company of Indiana. It is building in that State about 550 miles more. Its affiliated company, the Long Distance Telephone & Telegraph Company of Alabama, has in operation and is building 800 miles more, or a total of 2,050 pole line miles, representing an expenditure of about two million dollars, all financed and going. This company's lines will connect with those of the long distance companies in Ohio, Indiana and Missouri. It will have a trunk line running straight from Louisville to Mobile, Alabama, one circuit of which is made of No. 6 copper wire. It will have lines to Memphis, to Atlanta, to Florida and to such other points as seem desirable.

These are the existing conditions. What the future will bring

*Abstract of paper read at the Convention of the National-Interstate Telephone Association.

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forth is difficult to prophesy—because the imagination is apt to stop far from the ultimate limit.

As Richard Edmunds wrote in the February number of the *American Monthly Review of Reviews,* putting words into the mouth of the South, "We are independent, we can stand alone, we have accumulated enough money and experience to assure a great and steady advance; but so vast is the field, so sure are the returns that we bid the world a welcome: that all may share in the utilization of our resources and the consequent wealth to be created."

WEDNESDAY'S PROCEEDINGS--THE ROLL CALL OF STATES

Uniform Reports of Rapid Development, Successful Competition and Wholehearted Support From the Public Made by Representative Delegates From Many Parts of the Country.

As soon as the convention was reopened at ten o'clock Wednesday morning, the president appointed a committee to confer with the Chicago Commercial Association regarding the telephone situation. The committee named was C. B. Cheadle, F. Dagger, E. R. Conklin and Manford Savage.

Nearly the entire forenoon session was given up to some very interesting reports brought out by a roll call of States.

Arkansas was represented by Mack Hammett. According to Mr. Hammett the Arkansas toll lines average from $8 to $9 per subscriber each year. The Texarkana toll line earns 22 per cent. and that at Ozark 20 per cent. It is an interesting fact that many bankers are owners of exchanges. In the State there are all told 8,980 Independent telephones, while the Bell company has 11,885.

Louis Blankenhorn spoke for Southern California. In that State the Independents are now reaching out to San Francisco and Oakland. In Oakland an Independent company will start in six months with 5,000 subscribers. A franchise has been given to the Home Company at San Francisco which expects to start with at least 1,500 subscribers. There are 30 companies with an investment of $30,000,000 in southern California, all on a substantial footing, with at least 43,000 telephones, as against 33,000 Bell.

There were several spokesmen from Canada. Dr. J. F. Demers spoke for the province of Quebec where the Independent movement has been making great progress, notwithstanding conditions are very different from those in the States. There are about 7,000 Independent telephones in the province and some $1,000,000 invested.

Mr. Wilson and Mr. Mayberry spoke for Ontario, where there are over sixty companies and systems. The province of New Brunswick is also developing rapidly.

Frank L. Beam spoke for Ohio. He said that one year ago there were in the State 248,304 Independent telephones, as against 130,080 Bell and that during the year the Independents had increased over 54,000 telephones. He had been told that this was 15,000 more than the total increase of the Central Union Company operating in Ohio, Indiana and Illinois.

Charles S. Norton spoke for Indiana, pointing dramatically to Indiana's huge sign placed over the door and reading "400 companies, 1,500 stockholders, 200,000 telephone subscribers, $20,000,000 capital invested." In the State there are five times as many Independent telephones as there are Bell, one-fourth of whose patrons are in the cities of Evansville and Indianapolis. The speaker predicted that inside of one year Evansville would be rescued from the trust.

Iowa was represented by P. C. Holdoegel. He reported that the Independents of the State had placed a State agent in the field on a salary with excellent results. The increase during the year was ten per cent. and the Independents now reach practically every part of Iowa and are still growing. Nearly 1,500 Independent telephone companies reported for taxation and paid more taxes than the Bell, Western Union and Postal combined.

M. G. Miller responded for Kansas and reported great growth.

Mr. Cole reported that in Kentucky a majority of the towns of from 1,500 population up have Independent exchanges. Development of the long distance service had begun and is being rapidly pushed.

When E. B. Fisher arose to speak for Michigan he was received with applause. He spoke briefly concerning the advantages of organizing according to the Ohio idea. He was followed by J. B. Ware, secretary of the Michigan association. According to Mr. Ware Michigan has over 80,000 Independent telephones. Six years ago after Detroit and Kalamazoo sold to the Bell there were less than 30,000. The State is owned largely by a few companies, the Grand Rapids company alone having over 27,000 telephones in use at the present time. This has been a banner year for growth. In the entire State the Bell company probably has a few more telephones than have the Independents; but in the lower peninsula, outside of Detroit, where the Bell has from 15,000 to 18,000 telephones, the Independents have fifty per cent. more. In Detroit an Independent company has secured a franchise and has $3,000,000 at its disposal. The work of laying conduits has commenced. The outlook throughout the State is very satisfactory.

W. B. Scruggs reported for Missouri. The State is in excellent condition as far as Independent telephony is concerned. Only one section remains unorganized. There are about 50,000 Independent telephones in the State. Splendid results were obtained during the past year by the employment of a traveling secretary for purposes of organization.

R. E. Mattison spoke for Nebraska, where 265 Independent exchanges are being operated with 75,000 telephones. The Bell has far less than this number. All this has been accomplished within six years. The State is organized on the Ohio plan, five districts having been established this year.

C. B. Cheadle responded for Illinois. After welcoming the delegates in behalf of the State, he said that Illinois had been divided into eleven districts, in nine of which effective organizations exist. In the State there are 160,000 Independent telephones, and over 30,000 subscribers of Bell sub-licensees, most of whom will become absolutely Independent as soon as they can secure proper long distance facilities. He spoke of the great need of connection with Chicago.

Charles E. Sumner of Portland, Oregon, gave a most interesting account of his fight with Bell influences in his effort to organize the States of Oregon and Washington. Mr. Sumner and his associates have organized on a broad basis with the expectation of ultimately developing the entire district. They have the Bell monopoly on the run and the people on the side of the Independents.

Senator Kline of Pennsylvania reported that the Keystone State has 150,000 Independent telephones, 25,000 miles of toll lines, 300 exchanges and 2,486 toll stations. He closed with a parting admonition: "The Independents have enough to do to fight the Bell; let us not fight each other."

Theodore Gary presented the report of the executive committee to which had been referred a petition from the Independent manufacturers to be permitted to join the association and send representatives. The committee recommended that for the period of one year the manufacturers be received into membership on the following basis: (1) That the arrangement be for one year; (2) that the manufacturers contribute $10,000 for the year commencing May 1; (3) that they be allowed one representative on the advisory board; (4) that they be allowed twenty-five representatives.

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Mr. Gary moved the adoption of the report. This was opposed by J. B. Ware of Grand Rapids, Mich., who moved as a substitute that the matter be referred to the committee on amendments in order to receive thorough consideration before being passed upon. He was supported by J. G. Thompson of Ohio, Senator Kline of Pennsylvania, Mr. Holdoegel of Iowa and others. The substitute was adopted.

An invitation was received asking the delegates to visit the plant of the American Steel Wire Company at Waukegan, and a number decided to remain over until Friday to do so.

"Look For The Shield!"

By R. A. Walker, Des Moines, Ia.

OPPORTUNITY does not as a rule make many stops at the same door, but it would appear that we have been chosen as a glaring exception to that rule, that we may again and again have the chance to take up the thread where we have left or deserted it, and be allowed the privilege of taking our time and inclination of placing ourselves as a power and a unit before the people.

One year ago this organization adopted as an Emblem, a standard that we all might and must use, the "Shield," with a standard wording well adapted to our use. No wiser thing could have been done from the standpoint of unity and the means of showing that unity before the telephone using public.

It remains for us to make this "Shield" the greatest advertising symbol that the country has ever known. We'll make ourselves into a Lodge, with this "Shield" as a Badge that will identify us and serve as an introduction between Independent telephone men from one end of the country to the other. Our interests are common, our action *must* be in unity. Remember then that if we are to show a common front the Emblem must be the same everywhere. Our "Shield" has the orthodox form with these additions: the interlined word "Independent," surmounted by nine stars and underlined with thirteen, while across the two color body appear the words "Local and Long Distance" and below in the blue stripe "Telephone." Let there be no changes, not the omission of a single star nor the change of a word. Make this thing the same from coast to coast. Some have already placed their own or corporate name in the place of the word Independent. STOP IT. DON'T DO IT. Every change that you may make will detract from the power that the universal sign should be. Let's have a Badge to tie to.

The means are at hand and have been lying dormant for the many years past that will give us the end that we desire. In the Independent telephone industry we have banded together through this organization thousands of telephone men and operating companies whose aggregate yearly expenditure for printing and advertising of all kinds would astound the heaviest publicity agents and advertisers of this advertising age. What then should be the result if the more than 6,000 Independent telephone companies will use the "Shield" on everything that they print, such as stationery, letter heads, bills, cards, forms of all kinds, posters, directories; place a standard sign bearing the "Shield" at every Toll station, office and booth; and upon every suit of clothes wear the Badge in button or pin and see that every employee, every officer and director, is so equipped. If this were done in Iowa alone there would be more than 13,000 wearers of the "Shield" and throughout the country this Emblem would be placed before the public eye ten times a day for every telephone that we have in operation or billions of times in the year. Could you imagine that the American public would not take notice of such a thing as this? Everlasting persistence is the price of success. Then let us begin now. Are you wearing a "Shield"—if not, why not? Look for the Shield! Has the man next to you a "Shield"? If not, have his credentials looked into. You are appointed on the committee to "Look for the Shield." When you go home announce to your Editor that you have been appointed on this committee and tell him that the wearers of the "Shield" are entitled to talk everywhere in the United States. At the same time put up the new sign, and pull down the Maltese Cross or any other sign that you may have been using; they may lead some poor unsophisticated one to think that you are not one of us.

Men—here lies an opportunity such as the big advertiser of "trade marks" would have been glad to have poured out a rain of gold to have duplicated and it costs you mighty little. We'll have an agent in every hamlet, village and town in every state in the Union working with an enthusiasm that salaries fail to buy.

Don't have to be pulled and carried along, be a part of this great combined effort that is going to place this "Shield" where it will become synonymous with Independent telephony and the definition will be changed in the dictionaries and all past meanings will be marked obsolete.

When you get a letter from a telephone man on which the "Shield" does not appear, remind him of the error, and if he hasn't them, that his association can furnish him with the necessary cuts, and to the faithful brother we'll write, "Yours bearing the Shield," etc. It will take but a few of these little things to bring the Emblem into universal use and it will so predominate as to make the "Blue Bell" one of the great finds of the "antiquity hunters."

Undoubtedly you have read the very thorough and interesting as well as effective articles by Mr. Latzke, which are now being published in the Success Magazine. You have read the excellent articles appearing in the Chicago Tribune covering the Chicago situation and in your mind's eye have seen the time when Chicago connections would be made; but what one thing have you done to help and assist those that are pounding at Chicago's gates? They have been forced of necessity to make their fight a personal one with the small (considering the total) number that surround the city. What power is there in a few small telephone exchanges with no financial listing, under innumerable names and arrangements with as many different managements? Have we in the past shown a unity of action and organization that would discredit opinions of this kind? If so, what has been the sign? We must show these doubters that we are of one mind and of one purpose. When the 5,000 and more Independent telephone companies in this country, following the "shield" for a banner, shall march down on this commonwealth and show them that the Chicago of to-day is a "puny" thing compared to what it would be if connection were established with the millions of Independent telephones throughout this land, brought together under one organization, the National-Interstate Telephone Association, bearing but one sign, and shouting but one cry, there will be no need of clamoring and beseeching, but this city as well as New York will meet us more than half way.

Gold would lose one-half its value without the glitter. Independent telephony loses one-half its power without its "Sign of Unity," the shield.

At many points what has in the past been competition has now developed into war. Everything that can be thought of to obstruct the onward march of this Independent army is being done from Boston, the headquarters of the monopoly.

Every army must have a battle flag; let us not forget ours. As the "Star-Spangled Banner" served as the emblem of independence of our forefathers and is still revered and defended by us, so shall the "Stars and Bars of the Shield" stand to us and our posterity as the symbol of the independence of the American people from the control of the telephone trust.

Abstract from paper read before the Convention of the National-Interstate Telephone Association.

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The Wednesday Afternoon Session

THE roll call of states was continued upon the opening of the afternoon session. West Virginia being called for, A. C. Davis responded. He reported that the Independent telephone companies of the state were on a dividend paying basis and making satisfactory progress.

Mr. Buzzell responded for Vermont and greatly entertained the convention by his account of the efforts made by the Bell company to get control of the Independent properties. Notwithstanding that he was in the hot-bed of the favorite district of the monopoly, covered by the New England Telephone Company, he said that Vermont has 28,000 Independent telephones. The states of New Hampshire and Vermont have one hundred Independent companies.

J. B. Earle responded for Texas. He made a very encouraging report of the successful fight against monopoly in the Lone Star State, where five or six companies represent more than one-half the investment in the state. He said it was only a question of time when Texas people would be willing to invest their money in telephone securities. They are at the present time so busy getting rich that six and eight per cent. on their money does not look good to them.

James B. Hoge, of Cleveland, re-elected President of the National-Interstate Telephone Association.

The report of the secretary of the Wisconsin association was presented by Mr. Webb. There are over 42,000 Independent telephones in the state. A very satisfactory sentiment prevails among Bell licensees and they stand ready to become full Independents as soon as the desired toll service is furnished them by Independents. The energy of the state association has been largely spent during the past year in assisting in obtaining an Independent franchise in Milwaukee.

Mr. Harper, of Wisconsin, gave a short explanation of the successful efforts made to compel the Bell people to maintain uniform rates in cities of the same class throughout the state.

President Folwell, of the Keystone Company, of Philadelphia, spoke. He declared competition to be the only method by which the public can secure good telephone service at reasonable rates. The securities of his company, he said, have been listed on the New York Stock Exchange, as far as he knew, the first instance where Independent securities had been so listed.

This completed the roll call.

Mr. Ivy L. Lee, of New York City, followed with his paper on "Telephone Publicity—Appealing to Public Opinion." After hearing it the convention tendered its thanks to Mr. Lee.

The convention adopted a very strong resolution, expressing its deep sympathy with every effort to establish Independent exchanges, and proffering such aid as is in its power to any movements in that direction.

Theodore Gary, of Missouri, precipitated a small storm by offering the following resolution:

"It is known that the Kellogg Switchboard & Supply Company, of Chicago, is owned by the Bell officials; therefore be it

"Resolved, That this association recommends that its members and all Independent telephone companies and individuals refrain from purchasing apparatus from them."

Judge V. P. Smith, of Niagara Falls, supported the resolution in a vigorous speech. Judge Taylor, of Fort Wayne, then arose to address the convention by unanimous consent, he not being a delegate. He had not proceeded far when Mr. Gary raised the point of order that being the paid attorney of the Kellogg company he should be denied the privileges of the floor. After a spirited discussion the convention voted to sustain the point of order and the Judge took his seat.

As there were several protests against the resolution as worded from companies who had been using Kellogg apparatus and were obliged to continue, the following amendment was made to the original motion and incorporated in it:

"Providing that those companies using the Kellogg equipment may continue to purchase additions and extensions without prejudice."

At this point H. D. Critchfield was permitted to explain in behalf of Mr. Milo G. Kellogg, who was in the room, that the sale of the Kellogg stock did not come to his knowledge until several months after it was made; that he immediately commenced litigation, now pending, to have the sale set aside, and every effort was being made to have it set aside. He asked the convention to do nothing which would reflect on the integrity and honesty of Mr. Kellogg as an Independent man.

Mr. Splane offered another amendment to the resolution, which was accepted, as follows: "Be it further resolved that in the event of the Kellogg Switchboard & Supply Company again coming into control of Independent people that this resolution be null and void and of no effect."

The motion with its amendments was unanimously adopted by the delegates to the convention.

Mr. Cheadle, of Illinois, thereupon moved the following resolution, which was adopted:

"Resolved, That the convention extend to Mr. Kellogg its heart-felt sympathy and encouragement in his efforts to regain his rights."

Mr. Critchfield again addressed the convention, calling attention to false and misleading statements which appeared from time to time in the Bulletin of the League of American Municipalities, especially to an article in the June number, concerning the telephone situation in Indiana. After considerable discussion, from which it appeared that the paper in question is in league with the Bell interests, the matter was referred to the press committee "for definite and positive action."

The convention, evidently regretting the necessity which had arisen for declaring the veteran Independent wheel-horse, Judge Taylor, out of order, passed a resolution recognizing the valuable services of the Judge, extending congratulations for his past successes and honorable career and best wishes for his future.

Judge Taylor was called for and feelingly responded, saying that he had never done anything in his life with such earnestness as he had felt in prosecuting the fights for Independent telephony. His brief speech was received with cheers.

The afternoon session concluded after a paper by R. A. Walker, of Des Moines, Iowa—"Look for the Shield."

Harmony and Good Fellowship at the Banquet

THE convention fairly took the White City by storm Wednesday evening. This was true, both literally and figuratively. It rained, and free from the restraining influences of a convention hall the delegates went in for a good time. The entertainment committee, in selecting the White City for the scene of the annual banquet and the evening's festivities, realized fully the possibilities which this popular resort offers to seekers after fun. They failed to realize that the noise and confusion inseparable from such a place would seriously interfere with the speakers and mar the after-dinner program. That the toastmaster, Colonel J. H. Powers, of Louisville, Kentucky, and those whom he summoned to the entertainment of the dele-

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gates could acquit themselves so creditably in the midst of such confusion and distractions, was a genuine triumph.

About 9:30 o'clock the feasting ended and Col. Powers took charge of the program with the remark, "The solemn part of the exercises would now begin." He said he had noticed that when the band played Dixie every Yankee present yelled himself hoarse, and that when it struck up "The Star Spangled Banner," every old rebel in the room went crazy with joy. He concluded that not only are we a harmonious, but a homogeneous people. After some facetious references to the Waterloo of historic fame and to Napoleon, who in his person represented the monopoly of war, he called upon J. H. Shoemaker, of Waterloo, Iowa, to respond to the toast, "Change and Exchanges."

Mr. Shoemaker captured his audience from the start. "Don't make any mistake," he said, "I'm not Napoleon, nor am I Wellington. The toastmaster did not tell you who I am because he does not know. I am not a telephone man. I am not a poet. I am not from Indiana. I am not from Missouri. I came to find out some things." Mr. Shoemaker then proceeded to read his response in verse, which was exceedingly witty and clever and was greatly enjoyed.

Mr. Jesse W. Weik, of Greencastle, Indiana, was then called upon to speak of "The Land of the Jack Oak and the Paw Paw." Mr. Weik seemed to be possessed of the idea that Indiana is the greatest country on earth and he was not at all backward in saying so. He said it, too, in language both graceful and forcible. He closed with a glowing tribute to the cause of Independent telephony.

Charles E. Sumner, of Portland, Oregon, spoke of "The Great Northwest." He began by complimenting the marvelous development of Southern California. He said that there was a popular misconception concerning the Northwest. Some people seemed to think that it rained there during seven months of the year, and that people even had to climb upon tables to keep out of the way of the water. He had seen, on occasions like the present, men dancing on tables, but wanted to assure the convention that water had nothing to do with it. He spoke briefly of the great struggle which the Northwest had been making, and in conclusion said: "It is up to us, to this organization, to take up the shield and raise it onhigh, to go on and on and carry it forward until the battle is won and monopoly lies dead at our feet.

Nelman F. Wing, of Grass Lake, Michigan, spoke very pleasantly of "Our Rural Business. What Shall the Standard Be?" He raised a laugh at the outset by comparing the difficulties he was under, trying to make himself heard, to talking through a twenty-five party line with every receiver down and babies crying in every house. He spoke of the importance of the farmer to the telephone business and advocated a standardization of the treatment accorded various rural communities by the companies.

The concluding speech was by J. Walter Barnes, of Fairmont, W. Va., "Why Are We Here?" We are here, he said, among other things, to fight the common enemy; to consider the development of the individual companies and the connecting of districts by long distance service, and lastly to gather enthusiasm for the great work which must be accomplished by the closely affiliated companies in the future.

The Final Proceedings

UPON convening Thursday morning Messrs. West of Pennsylvania and Barnes of Virginia were added to the nominating committee.

L. G. Parker, of Louisville, Kentucky, read a very excellent paper on "Southern Toll Line and Exchange Development," which was received with great enthusiasm.

Senator Kline of the committee on Amendments to the Constitution reported that the committee had revised the whole constitution in accord with the conditions now surrounding the Association. The report in detail was read by Mr. Ware and adopted section by section. Many of the changes were verbal. One important amendment was the change of name to the "International Independent Telephone Association of America" in order to include the Independent companies in Canada and Cuba. The executive committee membership was reduced from nine to five. No provision was made for membership by individual companies, the idea being to foster the formation of state associations. Manufacturers of Independent telephone apparatus, dealers in poles and supplies, Independent telephone publications will be admitted to an Independent telephone contractors' associate members club without vote or right to hold office on approval of the executive committee and the payment of annual dues of $25. A further assessment may be made by the executive committee with the consent of these associate members. The advisory board is empowered each year to appoint committees on credentials, nominations and amendments to the constitution. The executive committee is required to approve all bills which are submitted to the association for payment.

W. B. Woodbury, Chairman of the Press Committee.

This revised constitution was adopted as a whole and five thousand copies were ordered printed for the members.

The following report of the committee on Standardization of Equipment was made and adopted:

1.—We endorse the resolution presented at the convention of 1905 by the preceding Committee on Standardization, recommending that a permanent Equipment Committee should exist and that a National Association Bureau of Standards and Engineering should be maintained.

2.—In our opinion the official selection of one unvarying type of telephone equipment as a standard for all companies in the Association is not feasible at present, and if it were effected it would probably discourage improvement and impede progress; but we believe that there can and should now be standards officially determined to which various kinds of material and equipment can be referred.

3.—In connection with the fixing of standards, it is highly desirable that many details affecting maintenance costs should be determined upon, specified and recommended for adoption by all operators and manufacturers as soon as possible. Examples of such details which have been fixed in other lines of business are, standard incandescent lamp base, standard threads on iron pipe, the standard system of machine screws and standard fittings for railroad practice.

4.—A unit of carrying value for telephone circuits should be determined as soon as possible, and the knowledge of it properly disseminated throughout the Association. The adoption and use of this standard unit will enable subscriber's lines, trunk circuits and long distance lines to be designed and treated in a uniform and definite way, and will render possible mutual understanding and co-operation in transactions involving such lines and line values, which has hitherto been impossible.

5.—We recommend that the Association carry the foregoing suggestions into effect, and to that end that a permanent committee be authorized, to be known as the Committee on Physical Standards; that this committee be apopinted immediately after the present convention to take the place of the present Committee on Standardization of Equipment, with power to carry on the required work under the direction of the proper officers of the Association. All determinations made by or under the direction of this committee should be recorded in the form of specifications, to be kept on file as a part of the permanent records of the Association, and standard materials as they are determined should immediately be given code marks and numbers for the convenience of maker, seller, purchaser and user.

6.—In addition to the foregoing, we further recommend that the officers of the Association be authorized and empowered to receive and act upon the recommendations of the Committee on Physical Standards, and to make the necessary business arrangements for carrying on the work of said committee, including provision for meeting expenses of the work, which, if possible, should be done without making it a charge upon the revenues of the Association.

All of which the committee respectfully submits.

SAMUEL G. McMEEN, Chairman. R. A. WALKER, Secretary.

Present at meetings: O. F. French, Edward E. Clement, J. W. Kelly, Edmund Land, R. A. Walker, Samuel G. McMeen, C. E. Stinson.

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The committee on the Standardization of Operating Rules and Regulations presented a voluminous report which, without reading, was ordered printed in pamphlet form for the information of members. The report dealt at length with toll accounting; recommended the appointment of a permanent committee of five to receive suggestions from members, and provided for the circulation of the committee's recommendations among members of the association.

The convention adjourned for lunch and reassembled at 1.30 to hear the report of the Nominating Committee. As the first business they announced the nomination for officers of the association during the coming year as follows: President, J. B. Hoge, of Cleveland, O.; vice-presidents, Theodore Gary, Macon, Mo.; C. E. Sumner, Portland, Oregon; secretary, Charles C. Deering, Boone, Ia.; treasurer, J. G. Splane, Pittsburg, Pa.

The report was adopted by all of the members, and the secretary instructed to cast the ballot of the convention for the men named.

J. A. Harney, of Cleveland, O., was recommended for assistant secretary during the ensuing year. It was further recommended that his salary be increased as a recognition of the large amount of extremely valuable work he has accomplished during the time he has held this office. On motion of E. B. Fisher, of Michigan, a vote of thanks was given to the newspapers and trade journals for their treatment of the convention.

The committee on photographs reported concerning the competition, which was so interesting a feature of the convention. It was decided that the first prize should go to the collection furnished by the Keystone Telephone Company, of Philadelphia, Pa. The next award was to the Lincoln Telephone Company, of Lincoln, Neb., and the third prize went to the Sioux City Telephone Company, of Sioux City, Ia. Honorable mention was granted to the Louisville Home Telephone Company, of Louisville, Ky.

One thousand copies of the convention proceedings were ordered printed for distribution. The assistant secretary reported that over 700 people had registered. As representatives from al parts of the country were present, this alone is an indication of the extraordinary success achieved by this convention.

The Executive Committee was instructed to investigate the prospects of the granting of an Independent franchise in Chicago and report in sixty days.

The remaining papers and addresses were ordered printed.

A resolution was adopted sending the greetings of the association to the Mayor, Board of Public Works and Common Council of Evansville, Ind., urging upon them the importance of granting an Independent telephone franchise in that city. Also there was adopted a similar resolution addressed to Milwaukee. On motion of Cyrus Huling, of Columbus, O., a vote of thanks was extended to President Hoge.

Much interest was expressed in the views advanced by Prof. Smith of Purdue University, at Lafayette, Ind. He addressed the convention on behalf of the young men taking the telephone course. He said that at the present time graduates from this course were very much sought after by manufacturers, while it is his belief that it would be much better for them to go into the operating field. He asked what operating companies needed in their young employees, expressing his wish to obtain information in order that their training might be made to accord with the requirements of the work which is being done. Operating companies were urged to take this matter up with the schools by correspondence.

Messrs. Norton, Woodbury and Holdoegel were appointed a committee to wait on the officers of the League of American Municipalities and ask if they are willing to stand for the untrue reports concerning Independent telephony which had been printed in the Bulletin, which purports to be an official organ of the League. It is said that some time was recently spent in investigating this Bulletin, and it was found very difficult to trace the origin of the articles or establish any responsibility for their publication.

Texas

By J. B. Earle, Waco, Texas.

TEXAS is an empire in itself, too big to be properly handled in so limited a time, even from a telephone standpoint. It is 938 miles west from Orange to El Paso; it is 587 miles from Laredo north to Texarkana. The traveller from Texarkana makes a shorter journey to Chicago than to Texline on the Eastern boundary of New Mexico. With an area of 265,780 square miles, embracing lands of all descriptions, one can readily understand it is not a difficult matter to find abundant opportunities for development in almost any enterprise. If Texas were as densely populated as Illinois it would have 14½ million people. If as densely populated as New York, it would have a population of 28 million, or New Jersey, 64 million.

As it is, it has only a little more than three million; in our largest county, Dallas, we have 92 persons to the square mile, while in Castro County we have only one person to 100 square miles.

The tax valuations amount to over 946 million dollars, which, divided into population, would give an average value of $314 to each man, woman and child in the state.

Our pine forests furnish lumber to Canada and the Panama Canal zone. We compete with Cuba for the highest quality of tobacco. You can to-day buy our peaches on the streets of Chicago, and fruit lands developed would supply the United States. We are to-day producing a great proportion of the world's output of oil; the mineral resources are fast coming into prominence with the highest percentage grade of iron ore in the world; fortunes are being made in raising rice.

Most of you have doubtless heard of us as cattle raisers and of the vast ranches, but these must be seen to be appreciated. The telephone constructer will learn no ranchman is so poor as to deny himself the conviences and quick methods of doing business. I have simply mentioned these things without speaking of the "Black Land Belt," or the heart of the state. This is a strip of land about four or five counties of seventy-five to one hundred miles wide, extending from the Gulf of Mexico up through Central Texas and to and through the Indian Territory, and in it you have thousands of square miles of the richest land in the world on which we grow our great crops of corn, wheat, oats and cotton. The greater or less success of the Texas crop of the last, fixing in a large measure the price of the world. Each of these products we raise in such quantities as would almost cause you to doubt the Government statistics. Our climate is such that we carry on our out-door work the year round.

We endeavor to pay our employees a fair wage scale, and while it is less than you pay, it is more to them on account of much reduced cost of living.

We have no labor troubles, first, because we pay fair wages, and second, we treat our employees fairly and promote on merit only, working the open shop and giving preference to the men who deserve it. The Bell company with us does not employ union men when it knows it, except in cases of emergency.

Considering our soil, climatic conditions and labor, we off-set our higher freight rate, so the cost of telephone construction is about the same as with you, while maintenance, of course, is much less.

The time was when Texas had the reputation of passing most

(*Continued on page 439.*)

Abstract from paper read at the Convention of the National-Interstate Telephone Association.

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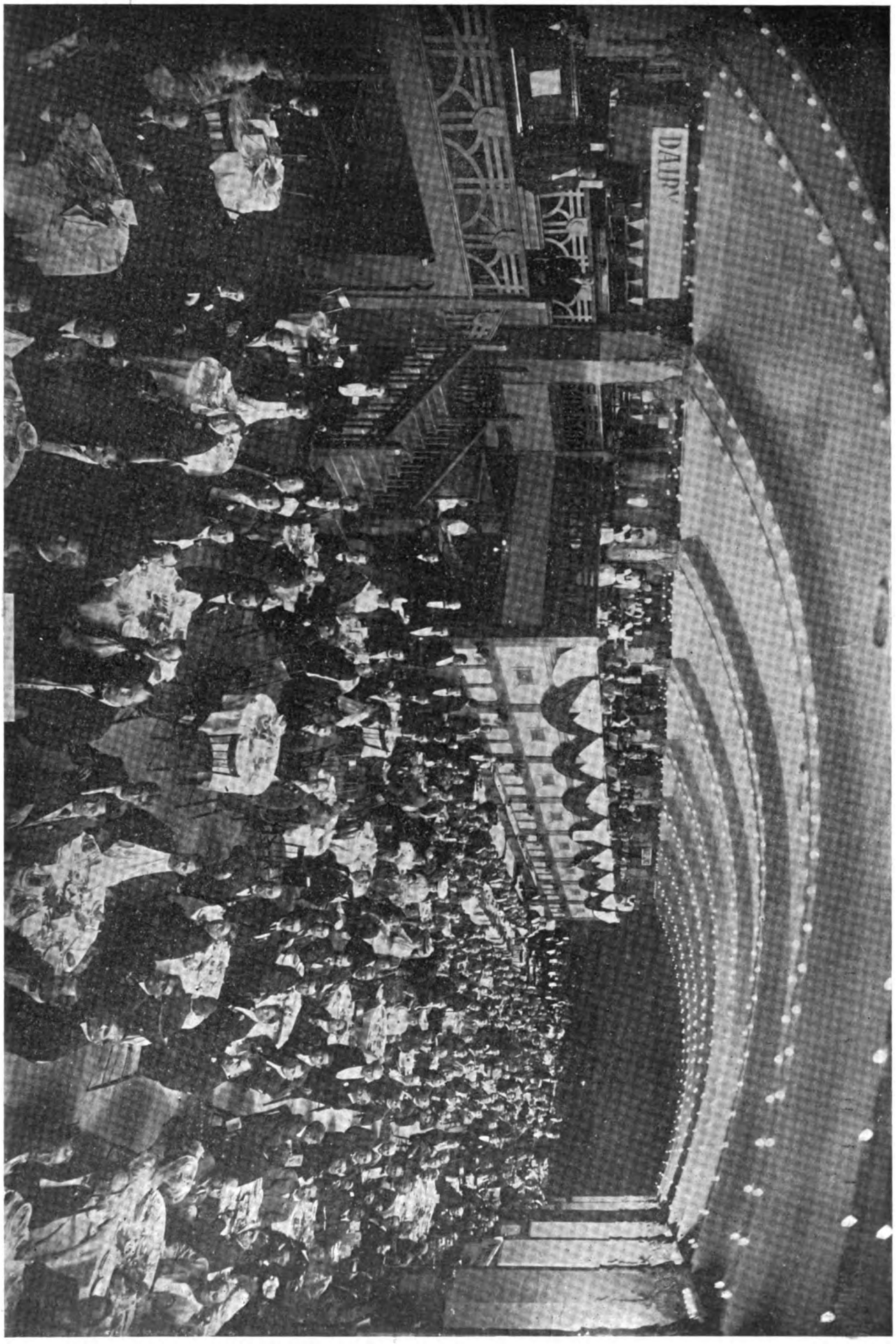

Delegates to the Convention Assembled in the Banquet Hall at the White City, Wednesday Evening, June 27.

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TEXAS.

(*Continued from page 437.*)

drastic laws, unfair to foreign capital and especially to corporations. This was more in the reputation than the actual character of the laws, more a theory than a fact, and I believe today, taken as a whole, our laws are as favorable to telephone and telegraph companies as are the laws of any state in the union.

True, we do pay 1½ per cent. of gross receipts as a gross receipt tax, but in return we are given privileges not enjoyed by our friends from some other states. Art. 698 of the Revised Statutes of Texas gives "corporations created for the purpose of constructing and maintaining magnetic telegraph lines (and our Supreme Court construes a telephone line to be a telegraph line) authority to set their poles, piers, abutments, wires and other fixtures along, upon and across any of the public roads, streets and waters of this state in such manner as not to incommode the public in the use of the roads, streets and waters," and says further, "That such companies are also authorized to enter upon any lands, whether owned by private persons in fee or in any less estate, or by any corporation whether acquired by purchase or by virtue of any provision in the charter of such corporation, for the purpose of making preliminary surveys and examinations with a view to the erection of any telegraph lines, and from time to time to appropriate so much of said lands as may be necessary to erect such poles, abutments, wires and other necessary fixtures for magnetic telegraph lines and to make such changes of location of part of said lines as may from time to time be deemed necessary and shall have a right of access to construct said line and when erected, from time to time, may be required to repair the same, and may proceed to obtain the right of way and to condemn lands for the use of the corporation in the manner provided by law in the case of railway corporations No corporation shall have the power to contract with the owner of land for the right to erect and maintain a telegraph line over its lands to the exclusion of the lines of other companies." Our statute also provides for the joining and consolidation of telegraph or telephone companies.

As a result of these laws almost all our trunk toll lines are built on the right of way of the railways, the same as the Western Union Telegraph Company is in your territory. In condemning the right of way of a railway company we select three men, who, after sitting as a commission to fix values, usually find from three to five dollars per mile damages for the railway company, and you can at once proceed with your construction work, even in case of an appeal from the decision of the commission. In one suit you can condemn the right of way of a whole system, and not have to proceed against them in each separate county. The advantages in this are apparent; we distribute our poles, cross-arms, wire, etc. from a slow train, paying only regular local freight rate for material and regular passenger rates for the men necessary to unload the poles, etc. During the entire time of construction the facilities for getting the men to and from work is of no small advantage. No right of way to be cleared or trees trimmed, and no corners to hold, while the distance from one town to another is always the shortest possible route. These advantages do not stop with construction, but are equally important in the matter of maintenance. In case of toll line trouble we send a man in our district to the nearest station with his railroad velocipede and as soon as he clears the trouble he comes in easily at from ten to twelve miles an hour. If the trouble tests within a reasonable distance he goes and comes on his car.

With our land values increasing so rapidly and paying such interest in rents to landlords, producing such profitable crops for tenants, with resources without number, as we so often find in newly settled countries, our people are so much absorbed in these things, with which they are familiar; they have little idle money to put in stocks, while six per cent. bonds do not appeal to them. Vendor lien notes on black land farms bear more interest than this, and are as safe an investment as Government bonds, which are considered safer than most other investments.

In Texas the customary rate for telephone rentals in exchanges of more than four to five hundred telephones is $24 for residence and $36 for business telephones per annum. While in the smaller exchanges the rate is $18 for residence and $30 per annum for business telephones. In each case the rural party line telephone takes the exchange residence rate, with from six to ten on a line.

These we believe to be fair and just rates, inasmuch as our long distance and special wire leases are where we look most for profit. The adopted rate by Bell and Independent companies for long distance telephoning is one cent per mile for five minutes, sixty per cent. of this for the minimum of two minutes, seventy-three per cent. for three minutes, and eighty-six per cent. for four and one-fifth of the five-minute rate, for each additional minute, and one-half of this for night rate. Some of our companies have adopted the Bell minimum rate of twenty-five cents, but in Central Texas we allow a minimum rate of fifteen cents for two minutes on calls less than twenty miles.

Some of you will be surprised to know that the Bell's best long distance station west of Chicago is Dallas, Texas, where the average is, I am informed, about fifteen dollars per telephone per annum.

People in our state have the telephone habit, and on account of our methods of handling, especially the grain and cotton crops, the long distance business is probably greater than any other section of the world on a basis of population. Our cotton harvest begins about the first of August and lasts six to eight months. The price of cotton is talked every minute of every day during the season. The farmer rings his exchange merchants, who in turn get the three markets, Liverpool, New York and New Orleans, not less than three times a day, and at times of many fluctuations, leaves notice with his cotton exchange to ring him on each variation of five points. Some merchants make arrangements to have us keep them posted and pay for the market $25 per month; this is given at a distance of not more than forty miles.

It is the medium cotton buyer who has a toll bill of from one to three hundred dollars per month, while I know factors whose wire rent and tolls in Texas alone amount to more than a thousand dollars per month during the cotton season.

In addition to our toll service we have some lines composited and receive for the telegraph privilege about $18 to $20 per mile per annum. This in no way interferes with the telephone service. In this last matter the Independent companies are much handicapped, as all these lines are for great distances, 200 to 500 miles, and altogether for cotton business. The price of a message is never thought of when selling even one bale of cotton, as a few points more than cover the toll charge. A bale of cotton is the same as money to us, yet the amount of money is a question, when it has been known to vary more than five dollars per bale in one day; you can readily see the man holding from 100 to a 1,000 bales, buying and selling all day, wants the market each minute. They all, in addition to having their telephones with the exchange, run specials direct to the long distance board on what we term "toll loops," and in many instances a special direct to the local cotton exchange. In many instances a cotton factor will have printed a list of from twenty to fifty of his agents in the field, simply giving each a number, and when he wants them he gives his code of numbers, frequently twenty at a call. Again our people have never learned to economize, and too frequently the telephone is used where a letter would have as well served the purpose. At fifty dollars per bale with Texas producing 3,000,000 bales, or twenty-three per cent. of the world's output, and each bale handled several times over the wires, one can readily understand how the Bell company in Texas can show in its tax report a gross receipt account of $2,381,699.57 for the telephone receipts, and $50,483.78 from six months' special wire rentals, and in a measure it shows the need of the many circuits they have through

(*Continued on page 443.*)

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Seattle, the Coming Independent City

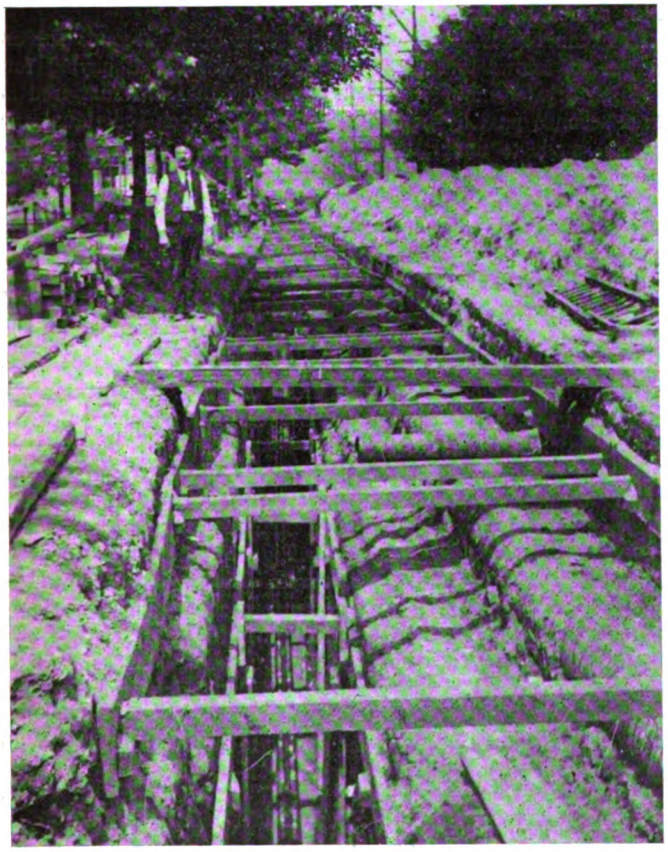
By William Johnson.

ORGANIZED at a time when only the Bell lines gave service to the people of the Puget Sound district and Western Washington, the Independent Telephone Company, of Seattle, has met the opposition of a well established and powerful competitor. After a fierce struggle it has gained a firm foothold and its great success promises to make Seattle a city of remarkable development of Independent service, and the starting point for the system which is being extended to cover the State.

One year ago there were in Seattle 7,236 subscribers for the Independent service; a few days since there were 11,471. Thus in a city of about 160,000 people the additions have reached the remarkable figure of 4,235 subscribers in eleven months. Considering with this the fact that on November 1, 1903, there were only about 2,000 paying telephones, and that new subscribers are now coming in at the rate of about 600 per month, the extent of the public approval of the efficient service which is being given may be readily grasped.

It is a fact, too, that this growth could have been increased if the company had been equipped to handle the business, and as soon as large extensions which are in progress under the direction of C. H. Judson are completed a great number of new installations will be made.

Work upon extensions of the plant is proceeding rapidly. Although a large cable plant is now in service, during the next

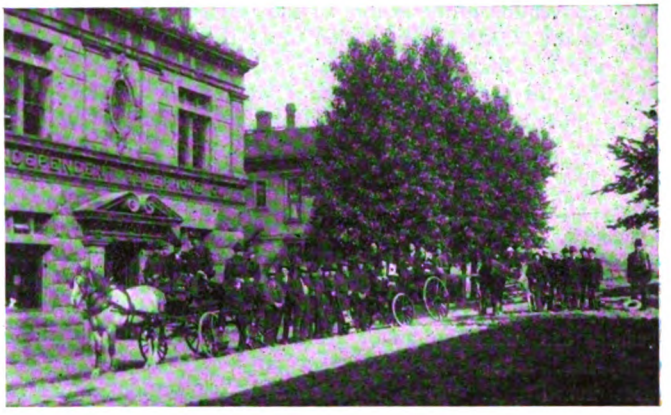


Underground work in progress in Seattle street. Conduits must be lowered on account of regrading being done by city.

few months it will be increased by nearly 50 per cent. Much new conduit is being placed, in spite of difficulties which have arisen owing to the extensive regrading of streets being carried on by the city.

In addition to the three present common battery exchanges two new offices are now being built, and when the switchboard work is completed there will be a sufficient capacity for about 27,000 lines. It is expected that about $500,000 will be spent upon the plant this year.

Since the success of the Seattle company has become an assured thing other cities in this region have hastened to give rights to Independent companies. Every important town in western Washington has now an Independent system in process of construction, and they will soon be connected with one another by long distance lines. A system at Portland Ore., is now being



Installers in front of the building of the Independent Telephone Company, Seattle. This crew put in 876 telephones during the month of May.

built. Independent plants are being put in at Tacoma, Walla Walla, Spokane, Everett, Bellingham, Port Townsend, and one is in successful operation at Port Angeles. A long distance company has been organized and has contracted to build long distance lines connecting all of these points, and work on the principal line is now being done. It will run from Portland, Ore., to British Columbia along the coast and connect with all points in Western Washington where Independent plants are established.

At present long distance lines are in use between the Seattle company and the Farmers' Mutual Telephone Company, which connects with thirty-one small points to the north of the city. Within the next twelve or eighteen months it is expected that the whole western part of the State of Washington, covering the whole of the busy Puget Sound district, will be completed and in full operation, with Seattle and its present company as the hub of this large and valuable system.

The extension of the system at the present extraordinary rate is due to the broad policy and able management of a group of men who are doing much for Independent telephony in the West.

BLOTTER SUGGESTIONS FOR BLOTTING OUT ALL MEMORY OF THE BELL.

L. A. HERRICK, manager of the Stephenson County Telephone Company, Freeport, Ill., has achieved considerable success in gaining new business through the proper use of effective advertising copy. Here is one of the verses which he suggests for use upon a blotter of the standard size, with the general arrangement that has been shown in reproductions of advertising matter of this nature which he contributed to a previous issue.

Not only in Freeport but in towns far away
The new local and toll service has come to stay.
Don't write or travel, just ask for "Toll,"
And if you don't get your party you are not in the hole.

The use of appropriate telephone advertising matter on blotters is rapidly gaining in favor. When a business man receives a neat blotter bearing a short verse or a concise argument he is favorably impressed with the Independent service.

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THE EDITOR'S PAGE

CHICAGO APPROVES INDEPENDENT TELEPHONE MEN.

NO convention in the history of Independent telephony, either of the National Association or of those preceding it, has equalled that which assembled for deliberation in Chicago this week. In point of attendance it was far in the lead. The seating capacity of the hall was insufficient to accommodate all who were present, and some were standing at every session.

Not only did the convention excel in numbers, but in enthusiasm. The very air was charged with optimism which was contagious. It was impossible to enter the hall without being impressed with the earnestness and enthusiastic zeal of the delegates assembled. There were not a few of the old war horses of Independent telephony, pioneers in that movement, which is wresting the American public from the grasp of the worst of monopolies. Many new faces were also seen and many new voices heard. It was a representative convention of strong men. It was moreover a gathering of fighters, for the struggles of the past ten years have developed the fighting instinct, even where before it had lain dormant. Whether the voice came from the great Northwest, or from New England itself, the breeding place of the Bell monopoly, it told of a winning fight against monopolistic greed and underhand methods.

In some respects the most notable feature of the convention was the address of welcome by Hon. J. Hamilton Lewis, the corporation counsel of Chicago, who appeared in behalf of the mayor. Like so many sons of the South, Mr. Lewis has the gift of true eloquence, making it a delight to listen to his easily flowing sentences and rounded periods. But it was neither his oratory nor his gracious words of welcome which most concerned the convention. He voiced the sympathy of Mayor Dunne, no less than of himself, with the cause to which the assembled delegates stand pledged.

The mayor, he said, had been especially anxious to greet the convention in person, for a great part of his life had been devoted to the same great principles and purposes which inspire Independent telephony. He himself recently had a part in investigating and controlling the Bell company in Chicago, which he did not hesitate to characterize as the most grasping and most relentless monopoly in existence. To-day, he said, the barriers have been thrown down and the gates of Chicago opened to those who would enter in the right spirit to give relief to a long suffering people.

It must be remembered that through the voice of Mr. Lewis the Mayor of Chicago was speaking—the executive head of a mighty city.

The companies which long have been seeking connection with this populous commercial center have a right to feel encouraged. Mayor Dunne sympathizes with the movement because it is in harmony with all of his ideals. Mr. Lewis is in sympathy because investigations made by virtue of his official position have led him to see the real nature of the Bell organization. It does not seem too much to hope that the business men of Chicago will at last awaken to the situation and demand access to the great channels of trade which are now closed to them.

Chicago business men ordinarily are not in the habit of overlooking opportunity, nor are they wanting in enterprise. Yet here are a million and a half Independent telephones in daily use throughout a great commercial district of which Chicago justly considers herself the focal point. Through these million and a half telephones the people talk with each other and across whole states; they can talk nearly from one end of the country to the other; but if they would talk with the business men of Chicago they are forced to patronize a monopoly in the grasp of which even Chicago is growing restive.

With the active co-operation of Mayor Dunne and his energetic and able corporation counsel, the Independent movement must succeed. Chicago will at last awaken to a realization of a long neglected opportunity and wonder why it did not happen before.

OBTAINING PUBLICITY.

DESERVING of the strongest emphasis is the point so well brought out by the speakers at the Convention that the way for a telephone company to keep the public interested in its work is to tell the people about the things which are new. Telephone service is a subject in which everybody is interested. Every manager knows how his subscribers get together and tell their troubles—that proves it. It is for the manager to give them something else to talk about.

If a man makes a call and has to wait thirty seconds for an answer he knows that he is not getting what he is paying for. The far greater number of calls, however, that are answered in three seconds pass by without comment. If each individual can only be made to understand that the long wait is an exception, he will be able to take a view which is not only favorable to the telephone company but which is just. Then if he will bring his occasional difficulties to the attention of the manager in a friendly way, so much the better for the company. This is an easy way to find out where the conditions need to be improved.

Newspapers are eager to tell every subscriber what is going on in every line of local business. If things are going well it gives them a chance to appeal to local pride, and news that helps them to this is good, and printable. It only remains for the manager to give information at the earliest possible moment, and in the right spirit.

A good many telephone men are prone to look upon the obtaining of publicity for their work as an attempt to gain free advertising, and they shun or seek methods looking toward this end according to their natural feelings on the subject. This, however, is far from being the correct view to take. Telephone companies should realize that newspapers are perfectly willing, and often eager to obtain matter of just the sort they are able to give out. The first aim of the manager should be to hold his service up to the highest standard and plan for frequent improvements; the second, to get the improvements he has planned into operation, and the third, to make them known to all the people in his town.

KEEPING THE STANDARD SHIELD.

R. A. WALKER in his address before the delegates to the convention brought out the necessity for avoiding any changes in the recognized emblem of Independent telephony. Above everything else the shield stands for unity of purpose. It is the symbol of the solid front presented by the firmly associated companies.

To be thoroughly representative of this high and useful sentiment, and incidentally to achieve its highest business value, the emblem must be universal. It is imperative that no change should be made from the standard form.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HEIGHT OF TELEPHONE WIRES IN NEW YORK.

Will you kindly tell me what distance above a telephone line another company is required to place its wires. Also, would the first party be justified in raising its wires or placing guard wires higher than its poles, and if so, how much higher? J. M. G.

THERE is no specified distance that must be kept between an established telephone wire and another newly erected to parallel or cross the first. The rule is that the one subsequently strung must be constructed a sufficient distance from the other so as not to interfere unreasonably with the use of the first. The distance therefore depends upon the circumstances of each case. In an Iowa case it was decreed that a distance of ten inches should at all times be preserved between the wires of two companies upon a country highway. In the same case the companies were required to keep a distance of four feet between their wires in the public streets of a village. The court thought there was good reason for requiring the wires of the respective companies to be separated by a greater distance in the town than was necessary along the country highway. Northern Telephone Co. v. Iowa Telephone Co., 98 N. W. 113.

The facts might be such as to justify the first company in raising its wires or in placing guard wires higher than its poles, but how much higher cannot be determined without a fuller statement of the facts than you have made.

KIND OF PIKE POLES TO BE FURNISHED EMPLOYEES.

Is there any law requiring a telephone company which furnishes its employees pike poles to handle its telephone poles, to keep them in good condition and the points well sharpened? We have a case where a workman was injured by the pole slipping because he had let the point get dull, and the telephone pole fell on him, bruising his head. He claims it is our fault, but we think the whole trouble was caused by his own shiftlessness. S. V. T. CO.

YOUR company performed its duty by furnishing pike poles of the ordinary kind and in good condition and would not be liable for an injury to an employee caused by the use of a pole upon which the point had become blunted or dull so that it could no longer be relied upon as a brace for poles which are being taken down. Towne v. United Electric G. & P. Co. (Cal.), 70 L. R. A. 214.

WHERE COMMISSIONERS DO NOT LOCATE POLES, COMPANY LOCATES THEM AT ITS PERIL.

THE town of Towanda, Ill., brought suit against the Interstate Independent Telephone and Telegraph Company to recover a penalty prescribed by the State law for alleged obstruction of the public highways of the town by placing telephone poles therein. The company was found guilty in both justice and circuit courts and appealed the case to the Supreme Court of the State. It appeared from the evidence that the telephone company, before it commenced erecting its line, caused the highway commissioners of the town to be served with a notice, according to law, that it proposed to construct a telephone line through the town and over certain highways and requested the commissioners to designate the portion of the highways in which it should place its poles. The commissioners read the notice, but not understanding its legal import, determined to consult their attorney about it and took no action. Subsequently the attorney for the commissioners prepared a notice which was served upon the telephone company protesting against the use of the highway by the company and instructing it, in case it did place any poles in the highways, to locate them immediately adjoining the fences. The company constructed about six miles of telephone lines in the town, many of the poles being placed from one to sixteen feet inside the lines of the highways. The circuit court held that the action taken by the commissioners was void and not binding on the telephone company because it was not taken at a regular or called meeting of the commissioners and that the company therefore had the right to place its poles in the highways, if in so doing it did not incommode the public, but held that the evidence showed the poles to be placed so that they did interfere with the proper use of the highways by the public. The Supreme Court affirmed the judgment of the Circuit Court in favor of the town and held that where highway commissioners failed to specify the portion of the highway to be used by a telephone company the company in placing its lines acted at its peril and was bound to so place them as not to interfere with the use of the highway by the public or to suffer the penalty prescribed. Interstate Independent T. & T. Co. v. Town of Towanda, 77 N. E. 456.

TWENTY DOLLARS PER MILE FOR ERECTING POLES.

JUDGMENT was rendered at Jackson, Miss., in the eminent domain case of the Cumberland Telephone and Telegraph Company vs. the Gulf and Ship Island Railroad Company. The court decreed that the Cumberland Telephone Company should pay to the Gulf and Ship Island Railroad Company the sum of $20 per mile for the privilege of erecting poles and lines for the operation of the telephone company along the railroad right of way. The judgment applies to all lines on the Gulf and Ship Island Railway in the State of Mississippi and amounts to $6,644.04, with the addition of costs in the sum of $94.70, which was promptly paid by the general superintendent of the Cumberland Telephone Company.

NEGLIGENCE IN HANDLING DEAD WIRES.

AN interesting discussion appears in the April number of "Case and Comment" under the above caption. The discussion has for its text a recent decision of the United States Supreme Court in Looney v. Metropolitan Ry. Co., Adv. S. U. S. 1905, Pg. 303, 26 Sup. Ct. Rep. 303. The question discussed is whether an employee should be held to the same standard of care and caution in handling an electric wire which he has the right to assume is "dead," that he is bound to exercise in handling what is known to be a "live" wire. The court held in this case that the defendant was not liable because the deceased employee for whom the suit was brought unnecessarily touched uninsulated "leads" in making a connection. The article cites a number of cases which hold that the employee need not be so careful in handling wires which he has a right to assume are "dead" as those that are "live" and characterizes the doctrine laid down in this recent decision as extraordinary. Among cases cited as illustrating the same theory as is now enunciated by the Supreme Court are two decisions holding that an experienced lineman employed by a telephone company who receives a shock because of the "live" condition of a guy or span wire belonging to a street railway company, which would have been "dead" but for a defect in the insulator or circuit breaker, is chargeable with negligence which will defeat his right to recover any damages from the telephone company where he failed to make any insulation test, although he had apparatus for the purpose and knew that defects in the insulation of such guy or span wires were common and that there was no one besides him to make such test. Bergin v. Southern New England Telephone Co., 70 Conn. 54, 39 L. R. A. 192, 38 At. 888; Anderson v. Inland Telephone and Telegraph Co., 19 Wash. 575, 41 L. R. A. 410, 53 Pac. 657.

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TEXAS.

(*Continued from page 439.*)

the black land belt. What this would amount to if they or the Independents had the state thoroughly covered, one can hardly foretell.

The Southwestern, or Bell is developing as rapidly as possible and the local Independents are doing well, but both together cannot take care of business. In no place do I believe there is a stronger sentiment or a stronger spirit in favor of developing the resources of a state. To this is added an opposition to all monopolies than runs through almost every individual in all classes of society. Texas offers no inducement for the telephone man who is strictly a promoter; and it is not a good field in which a man can invest his money and leave it to take care of itself. But to the man or set of men who will come to Texas and become associates with our people and secure the advantage of the personal element from association and friendship, I believe no field offers a greater opportunity for telephone investments, either in exchanges or toll lines.

Independent telephone exchanges have been built in most of the large cities of the state and are prosperous where they have been properly constructed, good service is given and the property well maintained. You can readily understand from what I have said that the one thing our telephone users demand is the best of service. The man who took time to go across the street for a drink and while he was gone lost fifteen hundred dollars on a cotton transaction has no use for telephone service where it takes him half an hour to get the toll operator. Trunk toll lines have been constructed through most of the black land district, but not nearly all of the valuable territory in this portion of the state is yet developed. There are a number of small towns in rich agricultural belts which have as yet no Independent telephone exchanges, and a fine field is open to the investor who builds such an exchange and connects the same with the smaller surrounding towns, most of which will support excellent telephone exchanges. I have under my management a town of not more than three thousand population in which we have an exchange of 287 telephones, at the rate of $18 and $30 per annum per instrument. This is one town located in a county having nearly 2,500 telephones in operation. Many of these smaller towns having a population of 10,000 or less have been built within the last year or are now being built, and the most valuable territory in the state will soon be taken up.

To the men who wish to construct good telephone exchanges and toll lines, among people predisposed to the Independent telephone movement, and will give the best of service and the business personal attention, our great state offers many attractions and good opportunities for profit.

The homeseekers' excursions run by the great railway systems give any man an opportunity at a small expense to visit the state and see for himself that the conditions exist as I have stated.

DELEGATES ENTERTAINED IN ROTUNDA OF AUDITORIUM BY SELECTIONS TRANSMITTED BY TELEPHONE.

ONE of the most interesting features in the exhibit line at the Convention, was the transmitter test given by the INTERNATIONAL TELEPHONE M'F'G. Co., Chicago, Ill., at its headquarters, Parlor 102.

This test was made by using a transmitter with 16 cells No. 1900 dry batteries direct in the circuit with the transmitter attached to a phonograph placed in the exhibit room, and connected to a receiver with megaphone attachment suspended in the rotunda of the hotel.

Though the transmitter became heated to such a degree that one could not bear to touch it after a half hour's continued usage with sixteen cells of battery, the transmission remained equally clear and distinct during the entire entertainment.

The delegates and visitors were also highly entertained a number of times through this circuit, with selections by E. H. Martin of the E. H. Martin Telephone Co. of Webster City, Iowa, the well-known whistler and impersonator.

These tests not only demonstrated the high quality of carbon used in the International transmitters and the durability of these transmitters under heavy usage, but they also showed the possibility of transmitting speeches or music to a large audience through one instrument.

The International company also showed various parts of its "growing exchange" switchboard system, lamp signal central energy multiple and trunking boards, including a full line of telephone apparatus.

The company was represented at the Convention by Henry Shafer, president; W. E. McCormick, vice-president; F. L. Middleton, sales manager, and A. W. McKay.

Some Prominent Men in the Manufacturing and Supply Fields

E. V. Brown, Electric Appliance Co., Chicago; J. H. Bell, Eureka Elec. Co., Genoa; G. S. C. Bauer, Century Tel. Cons. Co., Buffalo; J. G. Brobeck, Simplex Electrical Co., Boston; J. B. Bradley, Duluth Log Co., Central Tel. & Elec. Co., St. Louis; C. R. Baldwin, Baldwin Tel. Supply Co., Kansas City; M. I Berger, Vote-Berger Co., La Crosse; P. A. Rogers, Gen. Elec. Co., Chicago; M. E. Brown, Raber & Watson, Chicago; Chas. G. Ashley, McMeen & Miller, Chicago; C. E. Brown, Coml. Elec. Supply Co., St. Louis; O. Borchert, Julius Andrae & Sons Co., Milwaukee; W. C. Bogue, American Steel & Wire Co., Chicago; A. E. Barker, The Dean Electric Co., Elyria, O.; F. R. Bryant, Central Elec. Co., Chicago; C. S. Bundeman, Dean Elec. Co., Elyria, O.; W. I Blakemar, Elec. Appliance Co., Chicago; E. C. Brown, Elec. Appliance Co., Chicago; Jos. C. Belden, Belden Mfg. Co., Chicago; Geo. Metcalfe, Sterling Elec. Co., Lafayette; Frank B. Cook, Chicago; Geo. W. Brown, Chicago Tel. Supply Co., Elkhart; Wm. W. Dean, Dean Elec. Co., Elyria, O.; C. B. Clements, Chicago, Tel. Supply Co., Elkhart, Ind.; A. B. Crawford, Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.; S. A. Dinsmore, Elec. Appliance Co., Chicago; H. M. Coulter, Central Elec. Co., Chicago; Geo. W. Dain, Standard Underground Cable Co., Pittsburg, Pa.; W. H. Crumb, W. H. Crumb & Co., Chicago; H. Cleaver, Elliot-Blair Steel Co., Chicago; J. P. Cracraft, Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.; C. A. McCarthy, Elec. App. Co., Chicago; F. J. Conklin, American Steel & Wire Co., Chicago; W. E. Cook, Aut. Electric Co., Chicago; R. W. Craig, Amer. Elec. Novelty & Mfg. Co., Chicago; W. C. Doolittle, Sterling Electric Co., Lafayette, Ind.; H. S. Durant, Durant Elec. Sup. Co., Chicago; J. F. Crook, Aut. Elec. Co., Chicago; Interstate Ind. Tel. Co., Aurora, Ill.; F. J. Donnergal, K. S. & S. Co., Chicago; O. Brubon, Advance Pay Sta. Co., Chicago; F. J. Goodman, Century Tel. Const. Co., Buffalo, N. Y.; Arthur E. Einstein, Manhattan Elec. Supply Co., Chicago; J. E. Epper, Gould Storage Battery Co., Chicago; Geo. H. Fister, Stromberg-Carlson Tel. Co., Chicago; H. W. Eldred, Standard Tel. & Elec. Co., Milwaukee, Wis.; P. J. Eubanks, Stromberg-Carlson Tel. Co., Chicago; D. Gould, Stromberg-Carlson Tel. Co., Rochester, N. Y.; C. L. Fisher, Aut. Elec. Co., Chicago; Frederic Greer, Harvard Elec. Co., Chicago; E. N. Ford, Dean Elec. Co., Elyria, O.; R. S. Fields, Korsmeyer Co., Lincoln, Neb.; John Erickson, Aut. Electric Co., Chicago; H. Guttman, Aut. Electric Co., Chicago; A. D. Gillespie, Monarch Elec. & Wire Co., Chicago; P. W. Goodman, The Vote-Berger Co., La Crosse; Frank M. Howard, Edwards-Hine Co., Grand Rapids, Mich.; H. A. Jones, Stromberg-Carlson Mfg. Co., Rochester, N. Y.; A. J. Jackson, Amer. Elec. Nov. & Mfg. Co., Chicago; Ben. C. Hyde, Stromberg-Carlson Tel. Co., Chicago; E. H. Hammond, Amer. Electrical Works, Chicago; Frank B. Hall, Mountain State Elec. Co., Wheeling, W. Va.; S. A. Jones, Jones & Winter, Chicago; C. P. Hard, Mears Ear Phone Co., Chicago; F. B. Hudson, Stromberg-Carlson Mfg. Co., Chicago; Chas. L. Johnson, Western Tel. Mfg. Co., Chicago; S. R. Hauphurst, Smith Electric Co., Cleveland; R. A. Harris, Aut. Electric Co., Chicago; J. N. Hanson, Amer. Elec. Tel. Co., Chicago; H. S. Hopkins, Select Tel. Mfg. Co., Springfield, O.; P. J. Hertz, Wilson Pole Changer Co., Postal Bldg., Chicago; R. L. Kimble, Central Elec. Co., Chicago; A. C. Chenis, Stromberg-Carlson Tel. Co., Chicago; H. J. Kenny, National Carbon Co., Cleveland; V. P. Lewis, G. E. Mfg. Co., New Albany, Ind.; Louis Loeb, Rock Island Battery Co., Cincinnati; H. M. Kenna, Monarch Elec. & Wire Co., Chicago; A. F. Knierim, The F. Bissell Co., Toledo; J. A. Korr, Cleveland; W. H. Kidney, Century Tel. Cons. Co., Buffalo; J. W. Lenz, Runzel Lenz Elec. Mfg. Co., Chicago; F. W. King, Stromberg-Carlson Mfg. Co., Rochester, N. Y.; N. P. Kellogg, The A. H. Andrews Co., Chicago; F. A. Lundquist, Globe Aut. Telephone Co., Chicago; A. C. Kirkpatrick, Sandwich Pole Changer Co., Sandwich, Ill.;

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Louis J. May, Rock Island Battery Co., Cincinnati; Milton Taliafero, Gould Storage Battery Co., New York, N. Y.; P. D. Myers, Stromberg-Carlson Tel. Mfg. Co., Chicago, Ill.; S. W. Minsfer, Stromberg-Carlson Tel. Mfg. Co., Chicago; B. J. Mockenhaupt, Stromberg-Carlson Tel. Mfg. Co., Chicago; R. E. Macduff, Frank B. Cook Co., Chicago; J. Edwin Myers, Chicago Tel. Supply Co., Elkhart, Ind.; R. S. Mitten, Electric Appliance Co., Chicago; J. Myers, Sterling Electric Co., Lafayette, Ind.; M. H. Moffett, National Carbon Co., Cleveland; E. E. Meyer, Aut. Electric Co., Chicago; T. G. Martin, Aut. Electric Co., Chicago; Ray H. Manson, Dean Elec. Co., Elyria, O.; S. C. Platt, Frank B. Cook Co., Chicago; L. F. Philo, Ewing-Merkle Elec. Co., St. Louis; H. N. Powers, Gould Storage Battery Co., New York, N. Y.; Robt. E. Russell, Genl. Elec. Co., Schenectady, N. Y.; E. B. Overshiner, Swedish-American Tel. Co., Chicago; E. J. Pietzeker, Standard Underground Cable Co., Pittsburg; F. W. Pardee, Frank B. Cook Co., Chicago; Gary S. Powell, U. S. Coin Register Co., Toledo. Sam B. Rawson, Dean Electric Co., Elyria, O.

Telephone Publicity—Appealing to Public Opinion

By Ivy L. Lee.

THE art of appealing to public opinion on behalf of commercial enterprises is a matter of recent development. From time immemorial appeals to public sentiment have been made by politicians and social reformers with the result that the press has been freely open to them, thus leaving them an unobstructed avenue to the ears of the world. Up to a few years ago American corporations had proceeded upon the assumption that only two courses were necessary for them to pursue: First, to produce a commodity which the public needed and would purchase; and secondly, to fortify themselves behind all the safeguards created by the law. They were confident that their rights would be protected by the courts against all the caprices and clamorings of the people.

Within recent years there has been an awakening. Business men have come to see that the tribunal of last resort is found in the judgment seat of public opinion—a tribunal which even influences courts of law, and sways houses of Congress and marts of trade.

At a time when franchises were obtained for the asking, with a government or local subsidy sometimes thrown in, it was hardly necessary for a corporation to make an appeal to the public. Franchise rights were then of very doubtful value. But with the extraordinary increase of urban population, the marvellous progress of modern engineering science and the demonstrated revenue producing value of public franchises, the entire situation has changed. Corporations now realize that they must take the public into their confidence and that they must justify their very existence. Corporations are now coming to see that they must approach the court of public opinion exactly as they approach a court of law, and that this appeal must be made with due regard to the peculiarities and the machinery of the tribunal itself.

Many business institutions within the last two years might have said: "Your theory is entirely correct, but the principal avenue of approach to the public is the press, and in it we are not able to make our appeal except in the advertising columns, something expensive to the point of prohibition." This statement would have involved the thought that although the corporation was willing for the public to know those facts about itself which it wished to offer, it was unwilling to give the public the benefit of that information which the public had a right to have. The public is not unreasonable, but if there is one thing that it does demand, it is perfect frankness. A study of the art of appealing to public opinion, therefore, has involved two important questions: First, what it is that the public is legitimately entitled to know and wants to know concerning an enterprise? Second, what is the best means of presenting this material in a way to command a hearing? The fundamental fact upon which every intelligent appeal to public opinion must be based is a willingness to make the appeal to public opinon with the same frankness and thoroughness as an honest, straightforward business man would employ in presenting his side of a case before a court and jury.

With perfect truth, many corporate managers are constantly saying: "We feel that our business is honorably conducted, and that our purposes should commend themselves to the public, and yet we are constantly misrepresented in the newspapers." Granting that these premises are correct, a mistake has been made in not presenting the cause to the newspapers in accordance with the rules and technicalities which surround this powerful tribunal.

A newspaper lives to print news and advertising matter. There are, indeed, many occasions when it is but proper that business men should address the public only through the advertising columns. However, there are other occasions when the news and editorial columns are the only places to which access is desired, or where the publication of matter would be of the slightest value. This was very apparent in New York a few weeks ago when the Bell interests spent a vast sum of money in paid advertising to prevent the issuance of a franchise to the Atlantic Telephone Company. Had the campaign been planned plenty of time in advance, this extravagant outlay of money would not have been required and the public mind would have been very much more seriously impressed. Therefore, the problem is, how can we reach the news columns? The answer is obvious, though not altogether simple: The way to reach the news columns is to give the papers NEWS! What then, you will inquire, is news? I have never seen a better definition than that given by Goethe, who, nearly a century ago, wrote in his one great novel, "Wilhelm Meister," this paragraph:

"Ask yourself, or ask others, what invests a piece of news with its greatest charm. Not its importance, not its influence, but its mere novelty."

You must give the newspapers, therefore, matter which has about it some element of novelty. If this is done, and if the item is true, you need never fear that it will not be printed. Let the other side of the case be printed, too, but continue to present your own side, honestly and persistently, confident that, upon the examination of the evidence, the "jury" will decide justly.

My personal judgement based on a study of this subject covering a considerable period is that the appeal to public opinion on behalf of the Independent telephone should not be made with the idea of breaking down or eliminating the Bell telephone; but it should proceed upon the principle that competing telephone systems are of great advantage to the public, that just as a man can see less if he has only one eye, and can hear less if he has only one ear, just so is he robbed of his proper share of comfort and business efficiency by the use of only one telephone. The lesson should be driven home that the telegraph business in this country was never so effective or so cheap as it is now with two companies actively competing for the business. Let the position be assumed that the Independent telephone bases its claim for support solely upon its better service.

The telephone is one of the most interesting subjects before the world to-day. It is estimated that it has added 15 per cent of efficiency to the businesses which utilize it. It has been of infinitely greater value to the people who have used it than the rural free delivery service. It has made steps lighter; it has protected life; it has relieved panics; it has lightened the hearts and burdens of millions of people and it promises to save country life and bring back its charm. The people to-day are interested in everything that concerns the telephone, no matter whether it is the Bell or the Independent. The Independent movement is full of the most interesting news material, which the public will read eagerly and the newspapers will print gladly if it is only supplied to them in the right way. Every bit of your progress, the human interest incidents connected with the growth of your business, the facts concerning the resistless, inevitable march of your armies toward the great cities of the country—all these are of vital interest to the whole American people.

Abstract from the paper read at the Convention of the National-Interstate Telephone Association.

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Delegates and Guests at the Convention

ALABAMA.—Frank B. Jones, manager Morgan Co. Tel. Co., New Decatur, Morgan county.

ARKANSAS.—Mack Hammett, manager Pine Bluff Telephone Co., Pine Bluff, Ark.

DISTRICT OF COLUMBIA.—Edward E. Clement, Washington, D. C., member of Committees on Litigation and Legislation and Standardization of Appliances.

ILLINOIS.—L. S. Bowen, Carroll Co. Ind. Tel. Co., Savanna, Carroll county; J. A. Bortz, Ind. Tel. & Tel. Co., Nauvoo, Hancock county; P. M. Biever, Central Ill. Tel. & Tel. Co., Lincoln; Ed. T. Biever, Lincoln; Harry C. Barbour, manager Ottawa Home Tel. Co., Ottawa; T. T. Bridges, Mahomet Tel. Co., Mahomet; Undin Babcock, Pekin; A. J Bohymer, Petersburg; C. B. Cheadle, Interstate Ind. Tel. & Tel. Co., Joliet; E. R. Conklin, Interstate Ind. Tel. & Tel. Co., Aurora; J. S. Daily, Peoples Tel. Co., Chillicothe; John H. Drawyer, Empire Tel. Co., Bradford; Chas. E. Drew, Bunker Hill Tel. Co., Bunker Hill; C. M. Erwin, Ill. Western Tel. Co., Macomb; C. W. Forbes, United Tel., Tel. & Elec. Co., Chicago; Geo. H. Glass, Citizens Tel. Co., Pekin; Jos. N. Gamache, Home Tel. Co., Hospital, Kankakee county; R. A. Gates, The Illinois Tel. Co., Jacksonville; J. H. Hackett, Ill. Tel. Co., Jacksonville; E. C. Hennis, Northern Ill. Tel. Co., Sandwich; L. A. Herrick, Stephenson Co. Tel. Co., Freeport; Amy Hills, Citizens Home Tel. Co., Pekin; W. B. Lathrop, Jr., Citizens Home Tel. Co., Champaign; Lon Lee, Citizens Home Tel. Co., Champaign; Kempster B. Miller, McMeen & Miller, Chicago; S. G. McMeen, Chicago; H. Minkel, Bunker Hill Tel. Co., Bunker Hill; E. A. Quarfot, Ill. Electric Co., Chicago; W. H. Ramsey, Auburn Telephone Co., Auburn; C. W. Steiger, Inter-State Tel. & Tel. Co., Aurora; T. M. Sherman, Citizens Tel. Co., Cooperville; C. A. Stromberg, Inter-State Ind. Tel. Co., Aurora.

INDIANA.—W. M. Bailey, Richmond Home Tel. Co., Richmond; H. M. Berry, Bedford Home Tel. Co., Bedford; Mark P. Boone, Peru Home Tel. Co., Peru; R. F. Blount, Home Tel. Co., Wabash; F. J. Beaucord, Home Tel. Co., New Albany; J. A. Browne, Eastern Ind. Tel. Co., Winchester; Wm. E. Bowers, Home Tel. & Tel. Co. of Ft. Wayne; Chas. Cassidy, Mitchell Tel. Co., Mitchell; L. G. Davis, Hoosier Tel. Co., Salem; R. R. Faulkner, Newcastle Tel. Co., Newcastle; Thad. E. Honway, Monticello Tel. Co., Monticello; N. C. Hunter, Home Tel. Co., Wabash; Walter Jones, New Castle Tel. Co., Newcastle; Chas. D. Knoefel, New Albany Home Tel. Co., New Albany; A. C. Lindemuth, Richmond Home Tel. Co., also representing the Indiana Independent Telephone Association, Richmond; Wm. Haney, Mitchell Tel. Co., Mitchell; John L. Osborn, Veedersburg Tel. Co., Veedersburg; L. M. Noher, Royal Tel. Co., Milford; Chas. S. Norton, Long Distance Tel. Co., Indianapolis; W. M. Schimseyer, Citizens Tel. Co., Decatur; J. S. Shoemaker, Bloomington Home Tel. Co., Bloomington; B. F. Stevens, Hazelton Tel. Co., Hazelton; Theodore Thorward, Home Tel. Co., South Bend; W. A. Wright, Hillsboro Tel. Co., Hillsboro, Ind.; Jesse W. Weik, Greencastle Telephone Co., Greencastle.

IOWA.—Geo. N. Bandy, Hawkeye Tel. Co., Des Moines; John A. Baxter, Winfield Tel. Co., Winfield; J. S. Bellamy, Knoxville Elec. Co., Knoxville; Chas. G. Cockrill, New State Tel. Co., Sioux City; Chas. C. Deering, Boone Co. Tel. Co., Boone; Hal. C. Fuller, Lehigh Tel. Co., Lehigh; S. A. Gregory, Union Tel. Co., Stockport; Geo. T. Hewes, Ind. Tel. Clearing House, Des Moines; P. C. Holdoegel, Central Mut. Tel. Co., Rockwell City; G. M. Heiserman, Albia Tel. Co., Albia; J. Ed. Huston, Winfield Tel. Co., Winfield; C. A. Hollis, Ind. Tel. Assn., Hudson; S. S. Lichty, Corn Belt Tel. Co., Blackhawk; E. H. Martin, Martin Telephone Co., Webster City; Frank McNally, Washington Tel. Co., Washington; J. E. Mather & Son, West Liberty; F. C. Musson, Musson Bros. Co., Atlantic; Jos. M. Plaister, Fort Dodge Tel. Co., Ft. Dodge; R. R. Smith, Southen Iowa Tel. Co., Des Moines; W. J. Stanton, Corn Belt Tel. Co., Waterloo; J. C. Thorne, Jefferson Co. Tel. Co., Fairfield; T. A. Thompson, Sioux City Tel. Co., Sioux City; R. A. Walker, Mutual Tel. Co., Des Moines; A. F. Whittier, Corn Belt Tel. Co., Waterloo.

KANSAS.—C. L. Brown, Brown Telephone Co., Abilene; J. C. Kelsey, N. E. K. Tel. Co., Hiawatha; M. G. Miller, Olathe Citizens Tel. Co., Olathe; W. H. Nelson, Exchange Tel. Co., Smith Center; M. S. Taylor, Fayette Home Tel. Co., Lexington.

KENTUCKY.—Frank G. Hoge, Hopkinsville Home Tel. Co., Hopkinsville; L. G. Parker, Central Home Tel. Co., Louisville; M. B. Overly, Central Home Tel. Co., Louisville.

MICHIGAN.—J. R. Fuller, Union Tel. Co., Alma; John Babcock, Quincy Ind. Tel. Co., Quincy; A. R. Burch, Citizens Tel. Co., Battle Creek; F. O. Hughes, Citizens Tel. Co., Lansing; Frank B. Howard, Saginaw Valley Tel. Co., Saginaw; A. C. Hinebaugh, Southern Mich. Tel. Co., Burr Oak; Edmund Land, Citizens Tel. Co., Grand Rapids; J. C. Lees, Citizens Tel. Co., Grand Rapids; W. J. Molchers, Union Tel. Co., Alma; R. L. McCoy, So. Mich. Tel. Co., Burr Oak; B. A. Price, Saginaw Valley Tel. Co., Saginaw; Wm. Robinson, Citizens Tel. Co. of Muskegon, Muskegon; P. Wm. Schafer, Ida Tel. Co., Ida; J. G. Smith, Citizens Tel. Co., Jackson; C. E. Tarte, Citizens Tel. Co., Grand Rapids; H. H. Taylor, Citizens Tel. Co., Marshall; J. B. Ware, Secretary State Association, Grand Rapids; W. B. Woodbury, Home Tel. Co. Detroit, Detroit.

MINNESOTA.—R. S. Barry, Tri-State Tel. & Tel. Co., St. Paul; E. H. Moulton, Tri-State Tel. & Tel. Co. Minneapolis & St. Paul; H. W. Spooner, Tri-State Tel. & Tel. Co. Minneapolis.

MISSISSIPPI.—J. P. Helfenstein, Meridian Home Tel. Co., Meridian.

MISSOURI.—Jas. F. Barnett, Mo. Ind. Tel. Asso., Rutledge; Wm. H. Bassett, Kinloch Long Distance Tel. Co., St. Louis, Mo.; John F. Casey, Kinloch Tel. Co., St. Louis, Mo.; H. L. Gary, Nevada Tel. Co., Nevada; Theodore Gary, Home Tel. Co., Joplin; Mrs. H. L. Gary, Macon; Miss Mary B. Gary, Macon; H. L. Gary, Macon Tel. Co., Macon; M. L. Galladay, The Holden Tel. Co., Holden; R. W. Garner, Home Tel. Co., Joplin; A. B. Hughes, Hardin Tel. Co., Hardin; J. S. Haley, Lee's Summit Home Tel. Co., Lee's Summit; J. A. Hudson, Columbia Tel. Co., Columbia; Jas. F. Hudson, Columbia Tel. Co., Columbia; Ed. Lister, Capital Tel. Co., Jefferson City; Arnold Kolman, Kansas City Home Tel. Co., Kansas City; A. L. La Force, Columbia Tel. Co., Columbia; John H. Rogers, Kansas City Home Tel. Co., Kansas City; Hank McHenry, Capital Tel. Co., Jefferson City; M. R. Martin, Oregon & Forest City Tel. Co., Oregon; W. B. Scruggs, Cass Co. Tel. Co., Harrisonville; O. C. Snider, Kansas City Home Tel. Co., Kansas City.

MONTANA.—Thaddeus S. Lane, Montana Ind. Tel. Co., Butte.

NEBRASKA.—W. G. Francis, New Home Telephone Co., Beatrice; F. E. Ebersole, Lincoln Tel Co., Lincoln; R. F. Mattison, Nebraska Ind. Tel. Assn., Lincoln; Frank H. Woods, Lincoln Tel. Co., also Western Tel. Co., Lincoln.

NEW YORK.—John A. L. Campbell, Atlantic Tel. Co., New York, N. Y.; Martin W. Littleton, Atlantic Tel. Co., New York, N. Y.; Albert R. Smith, Niagara Co. Home Tel. Co., Niagara Falls, N. Y.; John M. Shaw, Atlantic Tel. Co., New York, N. Y.

OHIO.—J. H. Ainsworth, Home Tel. Co., Dayton; Lewis Brucker, Mansfield Tel. Co., Mansfield; E. L. Barber, Central Home Tel. Co., Louisville; Burton H. Brooks, Columbus Citizens Tel. Co., Columbus; C. S. Brewer, Ada Tel. Express Co., Ada; J. S. Chapman, Kenton Tel. Co., Kenton; Wm. Day, Bradford Home Tel. Co., Bradford; E. L. Coen, Vermilion Tel. Co., Vermilion; C. E. Cox, Eaton Tel. Co., Eaton; Henry A. Clark, Ada Tel. Express Co., Ada; Chas. D. Duncan, Home Tel. Co., Chillicothe; H. P. Folsom, Citizens Tel. Co., Circleville; O. F. French, Cuyahoga Tel. Co., Cleveland; Wm. R. Fee, Portsmouth Tel. Co., Portsmouth; Wm. R. Fee, New Citizens Tel. Co., Milford; Graham, Oberlin Tel. Co., Oberlin; Jas. B. Hoge, U. S. Tel. Co., Cleveland; J. A. Harney, N. I. & A. Tel. Co., Cleveland; W. B. Iles, New Citizens, Batavia; T. J. Hanna, Home Tel. Co., Dayton; Chas E. Hollander, Newark Tel. Co., Newark; G. R. Johnston, Columbus Citizens Tel. Co., Columbus; Washington Hyde, The Warren & Niles Tel. Co., Warren, Ohio; C. Y. McVey, U. S. & Cuyahoga Tel. Co., Cleveland; E. G. Miller, Warren & Niles Tel. Co., Warren, Ohio; Roy Owens, Citizens Tel. Co., Columbus; J. B. Rhodes, Zanesville Tel. & Tel. Co., Zanesville; D. Steel, Springfield & Xenia Tel. Co., Springfield; S. H. Statler, Piqua, Ohio; A. D. Schrader, National Interstate Tel. Assn., Cleveland; C. E. Stinson, Cuyahoga Tel. Co., Cleveland; T. J. Smith, Citizens Ind. Tel. Co., New Lexington; W. Gilbert Thompson, Hamilton Home Tel. Co., Hamilton; I. H. Thedick, Sidney Tel. Co., Sidney; C. D. Young, Citizens Tel. Co., Delaware; S. E. Ward, Mansfield Tel. Co., Mansfield.

OREGON.—Wm. N. Mead, W. Long Distance, Portland, Ore.; Chas. E. Sumner, Home Tel. Co., Portland, Ore.

PENNSYLVANIA.—H. E. Bradley, Eastern Traffic Assn., Philadelphia; Chas. F. Bender, Pittsburg & Allegheny Tel. Co., Pittsburg; Chas. Griffith, Johnstown Tel. Co., Johnstown; N. T. Folwell, Keystone Tel. Co., Philadelphia; J. P. Helfenstein, Consol. Tel. Cos. of Pa., Allentown; Frank Hart, P. & A. Tel. Co., Pittsburg; John W. Kelly, Jr., Keystone Tel. Co., Philadelphia; Chas. J. Mayer, Pittsburg, Johnstown Long Distance Tel., Johnstown; J. C. Sheahan, Keystone Tel. Co., Philadelphia; J. G. Splane, P. & A. Tel., Pittsburg; C. E. Wilson, Keystone Tel. Co., Philadelphia; Chas. West, Consol. Tel. Cos. of Pa., Allentown; W. R. Wilson, Union Tel. Co., Erie.

TENNESSEE.—Albert Parlett, Bristol Tel. Co., Bristol.

TEXAS.—J. B. Earle, Texas Tel. Co. & Brazos Valley Tel. Co., Waco; C. L. Simpson, Texas Cons. Long Distance Tel. Co., Dallas; J. B. Seeger, Texas Cons. Long Distance Tel. Co., Dallas.

VERMONT.—G. W. Buzzell, Citizens Tel. & Tel. Exchange, St. Johnsbury.

WEST VIRGINIA.—J. Walter Barnes, Cons. Tel. Co., Fairmount; A. C. Davis, W. Va. Western Tel. Co., Parkersburg; Jas. Knight, Cons. Tel. Co., Fairmount.

WISCONSIN.—M. S. Berger, La Crosse Tel. Co., La Crosse; W. F. Goodrich, La Crosse Tel. Co., La Crosse; J. C. Harper, Dane Co. Tel. Co., Madison; B. B. Harper, Dane Co. Tel. Co., Madison; J. A. Murray, Baraboo Tel. Co., Baraboo; J. U. Schmidt, Troy & Honey Creek Tel. Co., Prairie du Sac; Chas. Schumacher, Interurban Tel. Co., Sun Prairie; Will Van Middlesworth, Citizens Tel. Co., Racine; G. W. Wilder, Cambridge Tel. Co., Cambridge; H. G. Winter, Dane Co. Rural Tel. Co., Madison.

CANADA.—A. Hoover, Green River, Ont.; J. F. Demers, M.D., general manager Bellechase Tel. Co., Levis P. O.; Francis Dagger, technical adviser to recent Dominion Select Committee on Telephone Systems, Canada, Toronto; T. R. Mayberry, Ingersoll Telephone Co., Ingersoll, Oxford Co., Ont.; H. L. Gamel, Luther, Ont.; A. F. Wilson, Canadian Ind. Tel. Asso., Markham, Ont.

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Manufacturers' Exhibits

THE following brief mention will give some idea of the large and complete display of apparatus and specialties grouped by the various Independent manufacturers and supply houses:

THE NUNGESSER ELECTRIC BATTERY COMPANY, of Cleveland, Ohio, showed a line of its famous "1900 Dry Batteries." In the center of the room to attract the attention of all who passed along the corridor a spark coil was operated with 10,000 volts, showing a three-inch spark. Very pretty initial watch fobs were given away for souvenirs. In charge of this exhibit were H. G. Robbins, of Cleveland, treasurer; Thomas G. Grier, of Chicago, general sales manager, and H. S. Green.

THE AMERICAN ELECTRICAL NOVELTY AND MANUFATURING COMPANY and THE AMERICAN MIN. AND DECORATIVE LAMP COMPANY, of Chicago and New York, were represented by Alfred J. Jackson and a fine line of exhibits. The first mentioned company manufactures the "Ever Ready" dry battery, and the latter, switchboard lamps.

THE F. BISSELL COMPANY, of Toledo, Ohio, was represented by A. F. Knierim. The company showed among other things its new can top terminal and cable car, novelty sleeves and pot heads, and many other "Security" specialties.

THE NATIONAL TELEPHONE SUPPLY COMPANY, of Cleveland, Ohio, in charge of Fred Auxer, made a specialty of marline cable hangers and Blackburn ground wire clamps.

HUBBARD & COMPANY, of Pittsburgh, Pa., showed an assortment of general line hardware in charge of S. Seyler.

THE WOOD-CARNAHAN COMPANY, of Indianapolis, Ind., was represented by Marshall D. Binford. This company was an entirely new exhibitor, showing a line of books and accounting systems for the use of telephone companies.

THE SELECT TELEPHONE MANUFACTURING COMPANY, of Springfield, Ohio, showed its new farmer line lock out telephones. C. D. Juvenal, secretary and treasurer, and Wm. M. Bruce, Jr., vice president and manager, were in charge.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, of St. Louis, had a large display of protective apparatus. It showed the Becker cable heads, fuse blocks, switchboard apparatus, telephones, lineman's test set, etc. In charge were L. G. LeBorveau, G. F. Poertner, J. A. Becker, Charles Wallis and J. S. Cumming, president.

THE MICHIGAN ELECTRIC SPECIALTY COMPANY, of Muskegon, Mich., showed the Michigan improved party line telephone. V. A. Chapman was in charge.

THE CENTRAL ELECTRIC MANUFACTURING COMPANY, of Rock Island, Ill., was represented by Joseph L. Haas, secretary and treasurer, and I. G. Kusel. This company makes a specialty of the Black Hawk dry battery. It is the only battery made with corrugated zinc, which, it is claimed, gives larger surface, higher amperage and longer life. The battery is different also in that the other elements are seated in cloth.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, of Chicago, had a large and fine exhibit in charge of Ernest E. Yaxley, W. H. Trimm, sales manager, and T. S. Dunlap, of Springfield, Ohio. The exhibit included switchboards and apparatus, various kinds of telephones, both central energy and magneto. Visitors were decorated with handsome scarf pins, miniatures of the Monarch transmitter. In the same room THE STEEL GAIN MANUFACTURING COMPANY showed the Bulldog steel gain. Kempster B. Miller is president of this company, W. H. Trimm secretary, and E. E. Yaxley treasurer.

THE MILLER ANCHOR COMPANY, of Norwalk, Ohio, showed the Miller guy anchors, which "never pull up." G. H. Miller, president, was in charge.

THE FIBRE CONDUIT COMPANY, of Orangeburg, N. Y., had a display of underground conduits in charge of Mr. Smythe, western representative.

THE W. G. NAGEL ELECTRIC COMPANY, of Toledo, Ohio, had an interesting exhibit of Hercules anchors, "Swisher" marline cable hangers, tools, etc., in charge of H. E. Adams, sales manager.

THE U. S. COIN REGISTER COMPANY, of Toledo, was represented by Gary S. Powell. This coin register is a new pay station which gives the subscriber a record of the number of calls he has made and makes a tape record of the amount of money deposited in the coin box. The collector turns the tape in with the amount collected.

A display of the EQUIPOISE TELEPHONE ARM was made by George W. Conover, of Chicago.

THE WARNER ELECTRIC COMPANY, of Muncie, Ind., showed the Warner pole changer, with W. M. Sample in charge. In the same room the INDIANA STEEL AND WIRE COMPANY, of Muncie, had a display of steel telephone wire, with Harry L. Kitselman in charge.

THE WESTERN TELEPHONE MANUFACTURING COMPANY, of Chicago, showed a new line of common battery apparatus, switchboards and compact telephones. A "full line" sign in the corridor attracted a great deal of attention. On a full clothes line hung a large sized family wash, printed with proper advertisements of the company's goods.

THE AMERICAN ELECTRIC FUSE COMPANY, of Muskegon, Mich., showed a full line of terminal heads, distributing rings and protective apparatus. Frank G. Jones, president; J. A. Kenny, and G. W. Rodermer were present.

THE CHICAGO TELEPHONE SUPPLY COMPANY, of Elkhart, Ind., showed among other things a new selective lock out system, which works on either grounded line or metallic, a new type of visual signal board, which does not require battery power to hold up drop, and a new thing in a test set; also a new detachable hook and new receiver, the Lundquist automatic telephone system, and a new party line silent ringer, by which a party line subscriber those of the other subscribers. The company was represented by those of the other subscribers. The company was represetnted by G. A. Briggs, president; A. J. Briggs, H. C. Randall, F. R. Locke, E. L. Kerstetter, C. B. Clemons, G. W. Brown, D. F. Roseborough, F. A. Lundquist and N. E. Norsham.

RABER & WATSON, of Chicago, producers of cedar poles, had their usual exhibit. The green ends of cedar boughs were scattered through the corridor, as evidence of their line.

THE AMERICAN ELECTRIC TELEPHONE CO., in addition to its large Chicago factory, where numbers of the delegates were entertained, had a complete exhibit in several rooms. The most conspicuous exhibits were the Burns Adjustable Telephone, which is so well known that no description is necessary, and the Zabel 8-party selective ringing system, which was shown in full operation. An illustrated description of this will appear in an early issue of the JOURNAL. The company has just put on the market a new magneto generator built with round bars. It is claimed that the construction of this generator affords an exceptionally large output of current, the air gap being very small. Souvenirs in the form of miniature "American" receivers of hard rubber were distributed. The company was represented by P. C. Burns, president; J. G. Ihmsen, general manager; Max W. Zabel, sales manager; J. C. Henderson, W. R. Hauptmann, W. E. Herron, H. B. Blackledge, Gilbert Gislasen, H. P. Clausen and H. B. Hewitt.

THE EUREKA ELECTRIC CO., Genoa, Illinois, was represented by V. H. Meissenger, M. V. Mehren, Fred Holroyd. It displayed a central energy board equiped with a new visual target signal and also a lamp signal full central energy board, a late type magneto board, and a full line of magneto and central energy telephones. The feature of the exhibit was the new Eureka switchboard drop, so constructed as to permit of the easy removal of the coil from the shell without disturbing the armature. This drop is constructed with a laminated coil, it has an all rubber front and is mechanically self-restoring.

THE HOOSIER PIN & INSULATOR CO., of Salem, Indiana, exhibited for the first time a new combination insulator and pin.

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The pin is made in two wedge-shaped parts, so arranged as to hold the glass, which is also made in two parts, firmly on the line wire when the pin is in position in the cross-arm. L. G. Davis, president of the company and inventor of the new pin, was on hand to explain its merits to the delegates.

The Rock Island Battery Co., of Rock Island, Ill., had a splendid exhibit of the well known Rock Island batteries. The Rock Island Company has received many favorable reports from users of the battery, and received many satisfactory contracts from convention visitors. The company was represented by Louis Loeb and L. J. May.

Frank B. Cook, of Chicago, the well known manufacturer of protectors and protective devices, had a doubled barreled exhibit on the sixth floor of the Auditorium. The company was represented by Mr. Cook, F. W. Pardee, S. C. Platt, F. A. Raider, J. M. Moore, R. E. Macduff, H. R. Cook, F. R. Parker. Among other devices exhibited were the well known Cook pole top terminals, various types of protectors, guy clamps, wire connectors, test connectors, subscriber's station protectors and line fuses.

The Advance Pay Station Co., of Chicago, displayed a new type of pay station, which seemed to attract very favorable attention.

The Century Telephone Construction Co., of Buffalo, N. Y., was most ably represented and advertised by W. W. Kidney, G. F. C. Bauer and Frank J. Goodman. Four-party magneto selective switchboards and telephones, common battery 4-party selective party line system, an up-to-date power switchboard, magneto and common battery telephones, a new type of wire chief's desk for medium sized common battery exchanges, standard private branch switchboard, including a number of new features not previously shown, cable heads and telephone and switchboard parts, comprised a splendid exhibit which attracted many delegates.

The Leeds & Northrup Co., of Philadelphia, were represented by W. E. Weinsheimer, of the Minerallac Company, Chicago representative. Various types of cable test sets, fault-finders, portable test-sets and wall type galvanometers, particularly suitable for telephone work, made up the exhibit.

The Swedish-American Telephone Co., of Chicago, had a particularly attractive exhibit in the hotel, in addition to leaving the latch-string on its Chicago factory doors in plain view of every one making the trip to the Ravenswood district. The company was represented by its president, E. B. Overshiner, A. V. Overshiner, J. A. Russell and C. H. Macklin. At the hotel exhibit, the regular standard line of magneto apparatus, switchboards and equipment, and the company's combination lightning arrester and cross connecting cabinet were shown. A number of telephones made up in special woodwork designs and special finishes to match different interior treatment, attracted much attention and favorable comment. A souvenir watch charm, being a miniature of the company's regular receiver, was given out to new and old friends.

The North Electric Co., of Cleveland, had an attractive exhibit in the hotel, in charge of C. H. North, C. D. Boyd, Raymond Henderson and G. B. Pratt. The company showed a new magneto visual electric self-restoring signal, a line of small iron box switching stations for use on rural lines, a full line of magneto and common battery apparatus and a new train set for inter-urban electric lines. This set is carried on the motorman's paltform and is fitted with a large plug and flexible cord. Various poles along the right-of-way have a jack-box attached to the line wire. A gold plated souvenir hat pin representing the North transmitter made the company particularly popular with those of the delegates who brought along their women folks.

The National Carbon Co., of Cleveland, exhibited the well-known Columbia dry cells.

The Fisk-Newhall Telephone Mfg. Co., of Chicago, had a small exhibit of its motor coil winder, the Fi-ne Tubular Fuse, Fi-ne Generator Winder, etc.

The Electric Appliance Co., of Chicago, was ably represented by S. A. Dinsmore, manager of the telephone department; R. S. Mitten, H. N. Remington, A. J. Seltzer, E. C. Brown, E. V. Brown, J. B. McMullin and P. R. Boole. It had a complete line of "Eaco" telephones, switchboards and supplies, a line of Pierce specialties, among which may be mentioned the new jumperless transposition for toll lines, and Stombaugh guy anchors. On Wednesday night, after the banquet at the White City, the company sprung a surprise on the visiting delegates and made a distinct impression which will in all probability last until the next year's meeting, by presenting each delegate with a very large yellow ticket, admitting the holder to the fire show. During the show, which every one attended, one of the company's wagons, loaded with cross-arms, brackets, insulators, wire, etc., paraded the streets of the miniature city.

Dinsmore & Lawton, of Chicago, displayed a new flashing sign. They have gotten out a new Independent shield sign, all metal, with glass front, which they are selling at a very reasonable price. At the fire show, they had one of these signs on one of the buildings which was burned down.

Marke P. Boone, of the Peru Common Battery Lookout Telephone Co., Peru, Indiana, exhibited new lockout telephone, an illustrated description of which will appear in a later issue of the Journal.

The American Steel & Wire Co. had an exhibit of galvanized iron line wire and a huge punch bowl cheered the thirsty delegates. The company invited the delegates to the convention to visit its factory at Waukegan, Ill., placing a special train of Pullman cars at the disposal of the convention. On account, however, of the pressure of important business facing the convention, it was regretfully decided that it would be impossible to accept the invitation. The company was represented by Mr. Burley Ayres, advertising manager; C. S. Knight, manager of the electrical department; W. C. Bogue, George E. Quigley and F. J. Conklin.

The Chicago Writing Machine Co., of Galesburg, Ill., displayed the well known Adjustaphone, being represented by Mr. H. A. Weyl.

The Stromberg-Carlson Telephone Mfg. Co., Rochester and Chicago, was especially well represented in numbers and quality, both in the matter of its exhibit and its representatives. The company displayed a 140-line equipped section lamp line trunking board, and standard central energy telephones connected, and also a 4-party, 4-frequency system operating on the same board; a 200-line section generator call visual signal, electrical restoring drop board, with magneto instruments operating on it; a standard private branch exchange board, with lamp line signals of the desk type; mine telephones, street railway telephones, and inter-communicating telephones. The company has just opened a new department in the Chicago office to be devoted exclusively to line construction material. A very large stock of everything necessary in line construction materials will be carried, thus insuring prompt shipments. This department is in charge of B. J. Mockenhaupt. A new catalogue of line construction materials, together with net price list, will be mailed to those interested. The company was represented by T. W. Finucane, T. R. Finucane, A. J. Mahon, F. W. King, sales manager, H. A. Jones, A. B. Crawford, J. P. Cracraft, J. J. Nate, William Bowen, Jr., Wm. Bowen, Sr., C. S. Sifferd, N. C. Hyde, C. F. Speed, J. B. Wilkinson, Paul D. Myers, E. P. Shafer, Sam Menifee, George F. Fister, E. C. Lewis, A. O. Stigberg, J. H. Wagner, Carl W. Schafer, H. J. Wilms, F. G. Hutchins and B. J. Mockenhaupt.

The Mountain State Electrical Co., of Wheeling, W. Va., was represented by Frank B. Hall, A. F. Poole and H. L. Parker. For the first time the Poole Lockout System for party lines was displayed. This system will operate on any common battery exchange, either 24 or 40 volts, and there is no apparatus in the central office and no additional operation required on the part of the central office operator—in fact, it is claimed that an operator can handle 30 per cent. more lines with this system, because she has no arguing to do with subscribers. The

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system can be applied to any make of telephone. The company also exhibited the "No-Key" electric self-winding clock.

THE McROY CLAY WORKS, of Brazil, Indiana, was looked after by the genial "Kirk" Kirkpatrick.

THE VOTE-BERGER CO., of La Crosse, Wis., had a very comprehensive exhibit on the parlor floor of the Auditorium Hotel. Very great interest was shown in the new common battery ballast switchboard. There is not a relay in the entire switchboard, with the exception of that required to operate the night-bell. The company also showed a new plunger type intercommunicating system, the pendent telephone, which is claimed to be more popular than ever, and an express drop switchboard. A new wax finish is being used on the company's magneto telephones, which prevents scratching or marring of any description. The Vote-Berger Co. also exhibited the drive and twist anchors, manufactured by the D. & T. Anchor Co. The company was represented by M. I. Berger, secretary and treasurer, P. W. Goodman, E. C. Brewer and J. W. Johnston.

THE COMMERCIAL ELECTRICAL SUPPLY CO., of St. Louis, was represented by the general manager of its telephone department, Mr. E. C. Brewer.

THE EDWARDS-HINE CO., of Grand Rapids, Mich., was represented by Mr. Chas. C. Wilmot, manager of the telephone systems department, and Mr. F. M. Howard. They had a large exhibit, showing complete accounting systems for all telephone companies, from the smallest local system up to the largest company operating many exchanges. They also had a line of samples showing complete systems of clearing house records for traffic associations, filing cabinets specially arranged for telephone filing, one specialty being a cabinet arranged for the filing of toll tickets and toll bills, making a great saving in space and also insuring quick and ready reference to any toll bill or ticket of any subscriber. Mr. Wilmot demonstrated a new ledger binder known as the Proudfit loose leaf spring back blank book. It is very economical as a space saver over the ordinary type of loose leaf binder and attracted very favorable comment.

THE STERLING ELECTRIC CO. had perhaps one of the most beautiful exhibits at the hotel, occupying the room usually given over on the ground floor to the writing tables. On account of this location, the company's exhibit was the headquarters for a large number of delegates all day long, and sometimes quite late in the night. A full common battery multiple switchboard in operation, a full line of protective apparatus, a new can top terminal which made a decided hit, army type switchboard, the usual line of desk sets and telephones, and accessories and parts made up a very attractive exhibit. The company was represented by its president, W. E. Doolittle, H. T. Doolittle, Evan Shelby, Edward Clay, H. Mower, George W. Metcalf, W. R. Coffroth, O. P. Reed and C. E. Meyers. The company distributed miniature gold-plated models of the standard Sterling desk sets as souvenirs.

THE GENERAL ELECTRIC CO., Schenectady, N. Y., had an exhibit of its Mercury Arc Rectifier run in conjunction with the display of the Sterling Electric Co., and was represented by R. E. Russell.

THE VALENTINE-CLARK CO., of Chicago, was represented by its president, Eugene Clark, I. B. Eberhardt and F. L. McGillan.

THE AUTOMATIC ELECTRIC CO., of Chicago, exhibited in its headquarters, Rooms 604-608, a new type of automatic switchboard, such as will be used in San Francisco and Oakland, Cal., where the automatic system has been adopted by the Home Telephone Company.

The new system is known as the "Unit Type System" and marks a new departure in automatic telephony. It occupies about one-fifth the space of the previous type board made by the Automatic Electric Company, and will mean an enormous saving in outside construction. It is designed to be used in substation work. It has all the new features of the automatic, including common battery.

The Automatic Electric Company also exhibited a line of small magneto manual apparatus, such as is used for toll boards, etc., in connection with its automatic system.

Those representing the Automatic Electric Company at the convention were H. H. Woodworth, advertising manager; J. F. Crook, sales department; C. L. Fisher, sales department; E. K. Seymour, sales department; R. Brink Tyler, sales department; E. A. Mellinger, inspector installation department; E. E. Meyer, installation department; P. R. Davenport, installation department; C. C. Waggoner, installation department.

THE ELECTRICAL TRADES EXPOSITION CO., which gives its second annual show at the Chicago Coliseum January 11-26, was represented among the exhibitors by its managing director, Homer E. Niesz.

THE DEAN ELECTRIC CO. OF ELYRIA, OHIO, had a very interesting exhibit of standard Dean apparatus, common battery and magneto, and more especially was showing its "harmonic converter." The converter exhibited was on its way to Quincy, Ill. It is a pole changing device for supplying four frequencies, and sufficient to operate any exchange up to 75,000 lines. Ringing 300 bells through 75 operators' positions requires but thirteen amperes, and it will run light with one-third of an ampere. The company was represented by S. B. Rawson, William W. Dean, A. E. Barker, Ray H. Manson, W. H. Scott, A. B. Smith, Fred R. Freers, E. M. Ford, Frank Slough, Major Hoxhurst and C. S. Bundesman.

THE SANDWICH POLE CHANGER CO. OF SANDWICH, ILL., was represented by A. C. Kirkpatrick and E. C. Hennis, manager. It exhibited a pole changer and a duplexer which makes two circuits out of one and three out of two.

THE HARVARD ELECTRIC CO., of Chicago, represented by P. C. Lenz and Frederick Greer, showed the latest types in lightning arresters, fuse blocks, fuse wire and distributing boards. These were equipped with either the old style or new style fuse clips, the latter of German silver giving a full contact.

W. S. PEARNE and H. D. STROUD represented the Baird Manufacturing Co. of Chicago. This company showed its lock out telephones by which the talking circuit is cut off from all parties on the line except those for whom the connection is made. There is, however, an emergency signal by which the operator can be called if it should become necessary. The company also showed its new cash register pay station made of pressed steel.

THE GENERAL ENGINEERING CO., Chicago, was represented by E. W. Hammer.

THE WILLIAMS-ABBOTT ELECTRIC CO., Cleveland, Ohio, had an exhibition of its new switchboard drop, embodying several novel features, its standard desk set, various types of telephones, etc. Representing the company were L. Sands and H. J. Kusel.

THE STANDARD TELEPHONE & ELECTRIC CO. of Milwaukee, Wis., was represented by its general manager H. M. Eldred.

THE NORTH PENN IRON CO., Philadelphia, Pa., exhibited telephone construction material, pole ring terminals, pole seats, etc.

THE AMERICAN TELEGRAPHONE CO., Wheeling, W. Va., exhibited the telegraphone in Room 540. J. Shirley Eaton represented the company.

THE WILLIAMS TELEPHONE & SUPPLY CO. of Cleveland, Ohio, was represented by C. M. Hunt.

THE HAMILTON STEEL ARM CO., Adrian, Mich., exhibited a new type of steel cross arm which attracted favorable comment. The company was represented by its president and general manager, E. S. Hamilton.

THE JOSEPH STOKES RUBBER CO. of Trenton, N. J., manufacturers of hard rubber receiver sheels, mouthpieces, etc., was represented by Joseph Stokes and Messrs. Boyer and Carew.

THE AMERICAN ELECTRIC SIGN CO., Chicago, exhibited a number of novelties in electrical shield signs, for outdoor and indoor work. The company was represented by H. C. Dodge, manager of the city office.

THE MONARCH ELECTRIC & WIRE CO., Chicago, had quite an interesting exhibit of telephone wire, and construction hardware and tools. In charge of the exhibit were S. Mankowitz, C. L. Schwab, Louis Schwab and H. Gillespie.

THE AUTOMATIC TIME STAMP CO. of Boston, represented by its

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president and general manager, John C. Wilson, exhibited the timometer, a device comparatively low in price, for measuring the duration of telephone conversations over toll lines. The timometer being absolutely accurate, furnishing a printed record, being automatic in its action and requiring but a fraction of the operator's time for the pulling of a lever, drew practically every delegate's attention.

THE DAWES MANUFACTURING CO., Pitsburg, Pa., exhibited a new type of iron shield pay station sign made of opalescent glass. It was represented by J. A. Kerr and J. L. Dawes.

THE CHURCHILL CABINET CO., Chicago, represented by O. Gullickson and John J. Keenan, exhibited switchboard cabinet and telephone cabinet woodwork, presenting several finishes distinctly new to the telephone trade.

THE STANDARD UNDERGROUND CABLE CO. of Pittsburg, Pa., was represented by J. R. Wiley, W. M. Rogers, J. E. O'Neill, C. W. Davis, A. A. Andrews, E. J. Pietzcker.

W. H. JOHNSTON was on hand to give information concerning the specialties manufactured by the Hallett Iron Works of Chicago.

The Illinois State Convention

WITH an attendance of nearly 150 delegates from all parts of the State, the first annual convention of the Illinois Independent Telephone Association, which came to a close on June 20, was a great success. The association was formed at Peoria last year and this meeting was the first State session since its organization. Reports from the various officers showed that since its birth the association has advanced rapidly and papers presented during the meeting were of much interest to the visiting delegates.

The convention was opened Tuesday afternoon in the Coliseum, Peoria's largest assembly hall, by Mayor Tolson, who welcomed the delegates to the city, and President Conklin, of Aurora, general manager of the Interstate Independent Telephone and Telegraph Company, responded.

After the minutes had been read reports were heard from the following officers: President E. R. Conklin, Secretary C. B. Cheadle, Treasurer C. S. Hankins, Vice Presidents, first district, A. J. Vernier; second district, Frank Zinnell; third district, F. M. Ashe; fourth district, B. F. Wasson; fifth district, J. S. Dailey; sixth district, W. J. McQuiston; seventh district. W. H. Ramsey; eighth district, C. W. Shimel; ninth district, W. H. Bassett; tenth district, Hon. C. E. Hull; eleventh district, H. R. Aisthorpe.

A general discussion followed.

On Tuesday evening the most delightful social event of the session was held when a smoker was given visiting delegates at the Fey Hotel, the convention headquarters.

The program, which was unique, was as follows:

"Central Energy Supplies."

"Cross-connecting" Sandwiches. "Short Circuit" Punch.

"Magneto" Cigars. "Construction Gang."

"Straw Boss," F. W. Kelley, Springfield.

"Dead Lines," Retrospection—L. A. Herrick, Freeport.

"Live Wires," Introspection—C. S. Hankins, Decatur.

"Contracts," Getting Together, How and Why to Organize—C. A. Camp, Henry.

"Induction Coils," Financing a Telephone Property—J. H. Hackett, Jacksonville.

"Lag Screws," Little Things and How to Take Care of Them—A. E. Fleming, El Paso.

"Lightning Protectors," Public Confidence, What It Is and How to Get It—J. W. Barrett, Pekin.

"Self-soldering Fuses," Amity Among Independents—W. P. Landon, Rochelle.

"Alternating Currents," Ups and Downs in the Telephone Business—H. H. Bratt, Rock Island.

"A Busy Test," Getting Ahead of the Enemy—Hart F. Farwell, Bloomington.

"Wiping Joints," Leaks and How to Stop Them—E. D. Glandon, Pittsfield.

"Pole Steps," Climbing Higher Through Discipline—A. B. Conklin, Aurora.

"Anchor Rods," Business Men in the Telephone Business—Joseph Balliott, Belvidere.

"Hello Heaven," Contemplation—F. C. Woods, Galesburg.

Number, Please," The Telephone Girl, God Bless Her—Manford Savage, Champaign.

The response of Manford Savage, first vice president, to the toast, "The Telephone Girl," was especially approprate and well received.

At the Wednesday morning session the committee reports were heard. The reports of the various officers of the association showed that the Independent companies are making rapid strides in this state, and Secretary Cheadle advised the organization of associations in all states, and showed the benefit of state and national organizations of this sort. The constitution was changed to read two state meetings yearly instead of four.

When a special committee appointed to make certain changes in the boundary lines of the district association reported, its report was adopted without opposition. These changes were made in order that the various districts might be arranged to better advantage. The committee having this matter in charge consisted of the following delegates: Bassett, St. Louis; Daily, Chillicothe; Ash, Kewanee; Hackett, Jacksonville, and Aisthorpe, Cairo.

The most interesting address of the morning was that of Hon. F. Dagger, expert to the House of Commons' select committee on telephone systems of the Dominion of Canada, on "Telephone Competition vs. Monopoly."

Hon. E. H. Moulton, president of the Tri-State Telephone Company, of Minneapolis, told of the system used in handling the business of his exchange.

The paper of Miss Barnes, chief operator at the Springfield exchange, on "Discipline in the Switchroom," was listened to with keen interest.

All of the principal officers were chosen for additional terms, the election resulting as follows:

President—E. R. Conklin, Aurora.

Vice President—Manford Savage, Champaign.

Secretary—C. B. Cheadle, Joliet.

Treasurer—C. B. Hankins, Decatur.

Members of the executive committee—E. R. Conklin, Aurora; C. B. Cheadle, Joliet; C. O. White, Princeton; J. W. Barrett, Pekin; Manford Savage, Champaign; C. S. Hankins, Decatur, and W. H. Bassett, St. Louis.

Delegates to the National-Interstate Convention were elected as follows: E. R. Conklin, Aurora; L. S. Bowen, Savanna; H. C. Barborn, Ottawa; B. F. Wasson, Clinton; G. H. Glass; Pekin; C. S. Hankins, Decatur; C. L. Chapman, Tuscola; A. F. Loehr, Carlinville; C. E. Hull, Salem; H. L. Liebig, St. Louis; J. Manford Savage, Champaign; W. H. Bassett, St. Louis; C. B. Cheadle, Joliet; W. H. Ramsey, Auburn; J. S. Daily, Chillicothe; J. H. Hackett, Jacksonville.

NEW LINES TO CONNECT MISSOURI AND ILLINOIS.

A RIVER crossing between Hannibal, Mo., and Quincy, Ill., is being designed as a means of carrying some important new toll lines. These will connect Quincy and St. Louis via Hannibal, and also provide for messages between Quincy and Kansas City, taking in all intermediate points. This will give Hannibal long distance Independent service to all points in Missouri, Western Kansas, Iowa and Illinois. The new lines are to be of the most approved construction with ample circuits of copper wire to properly handle long distance service.

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QUERIES

SIGNALLING SYSTEM ON TOLL TRUNKING CIRCUIT.—(715.)

Upon our switchboard there was formerly used a trunking circuit from the toll board wired as shown by dotted lines in the enclosed diagram. Recently, however, the circuit has been changed by the addition of a relay, and other alterations, so that the wires which formerly went directly to the toll board contacts are wired throuh the relay contacts. As there was no trouble in the working of the circuit before I am unable to see any reason for the change. Can you explain it to me? R. R. L.

In Fig. 715 is shown the circuit you have sent. According to the original arrangement, shown by dotted lines, battery would flow continuously over the trunk and keep the lamp at the toll switchboard lighted all the time the subscriber is connected to a trunk. The addition of the relay X enables the relay V to be controlled by the operation of the relay W, but as, while it is operated, current through the windings of relay V passes through the 250 ohm coil bridge across contacts of relay X, there is no current on the line, and the disconnect relay at the toll board remains unoperated. When the subscriber hangs up his telephone the armature of relay W drops back, relay X is de-energized, and current from the battery passes out over the line, operating the disconnect signal at the toll board. It will thus be seen that the change brings about an improvement in the operating conditions, as the supervisory light at the toll board is illuminated only at the time disconnection is desired.

THROUGH TOLL LINE CIRCUITS.—(716.)

Will you please explain the nature of a "through" toll line circuit, stating why three jacks are required in the switchboard? J. E. N.

A through toll line may be considered, for example, as one which passes between two offices, A and B, one located to the west and the other to the east of an office C, situated midway between them. It is cut into the switchboard at C in such a way that messages may be sent from A to B or simultaneously from C to B and C to A. It is customary to use a single line signal at C, and three adjacent multiple jacks. The line signal is connected to the middle jack in such a way that a plug in this jack cuts it out of circuit. If a plug is inserted in the left hand jack, connected to the line to A the listening jack and jack connected to B are cut out of circuit. As the listening jack and its signal are still connected to line B, signals may still be received from that office, and connection established. The same holds true with regard to the line to A when the original connection is with office B. Thus the mere insertion of the plugs in the end, or line jacks, cuts the through line into independent sections. Code ringing actuating a drop is customarily used in order that the operator at exchange C may know when she is called. Unless a separate code is used by offices A and B it is necessary for the operator at C, when she receives a call, to plug into the listening jack and inquire which line is calling. She then puts up the connection on the proper line jack.

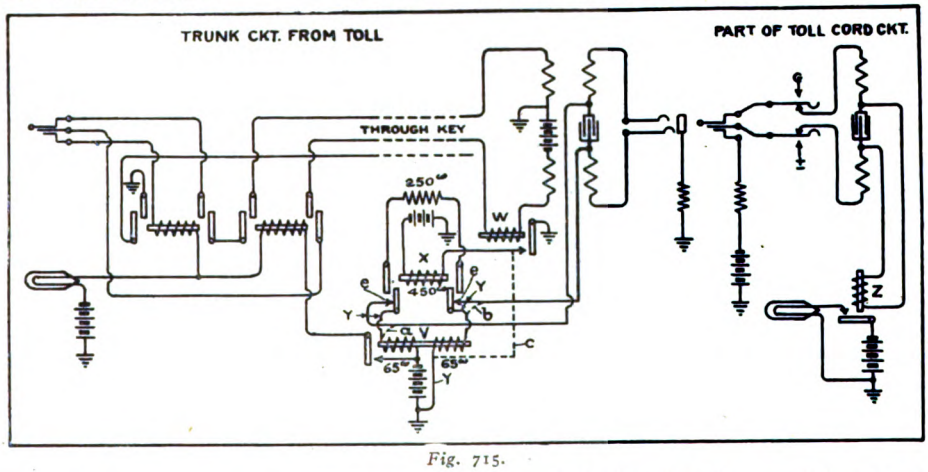

Fig. 715.

In common battery toll boards a circuit may be arranged to accomplish these results by a suitable arrangement of relays. In this case the listening jack is cross wired to an answering jack, but the drop is usually employed as a signal, as in the ordinary magneto board.

USE OF CHOKE COIL WITH RINGING MOTOR.—(717.)

Will you please explain why a choke coil is used between the battery and motor side of a 24-volt dynamotor used for ringing? N. L.

If you refer to a machine which is run by current supplied from the central office battery, the choke coil is inserted to prevent an objectionable noise from being heard by subscribers and operators when the machine is running. This noise would be produced on account of the variation of the comparatively large current passing through the armature, and tending to rise and fall with the movement of the commutator beneath the brushes.

By insertion of a choke coil these variations in the battery current are smothed down, so that no abrupt change in potential is produced at the battery terminals; consequently no humming noise is produced in the receiver.

It should be noted in this connection that the direct cause of any noise produced in this manner is due to a variation of potential at the battery terminals due to the variable C R drop introduced. Assuming that the resistance of the storage battery is a negligable quantity, as is practically true, if the motor were connected to the battery terminals, so that there would be no resistance between the end poles of the battery and the point of attachment, there would be no need of using a choke coil. It has, however, been found to be more practical and more economical to use a properly designed coil.

SIZE OF RELAY RACK BUS BAR (718).

Will you please tell me why it is customary to use large copper bus bars for the relay rack ground. In our exchange the sum of the areas of wires used to supply current from the negative side of the battery is far less than the area of the ground bus bars. As the latter can carry no more current than the sum of the separate currents flowing in the former it would seem like a wasteful use of copper. Can you tell me if this is so? N. J. B.

The use of a large bus bar is necessary on account of its entering into the busy test circuit. It will be remembered that in the ordinary central energy switchboard the busy test is obtained when the passage of current from the sleeve strand of a connected plug has made a difference of potential between the sleeve of the multiple jack and ground. If the sleeve were made to have a different potential by any other method the effect would be the same. If a small ground lead were used for the relay rack it would have a measurable resistance, and when several relays were working there would be a measurable drop in potential (the C R drop). It is evident, therefore, that the sleeves of jacks, connetced to this bar through the windings of cut-off relays, would no longer be exactly at ground potential, and every line in the board would test "busy."

It is solely to avoid this condition, and provide a reasonable margin, that the bus bar is made so large as to have practically no resistance.

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IN THE OPERATING FIELD

HOME TELEPHONE COMPANY OF OSKALOOSA TO HAVE LARGE BUILDING.

PREPARATORY to erecting a modern building for its new exchange the Home Telephone Company of Oskaloosa, Ia., has purchased property in the business district of the city. The building will cover an area of 40 x 120 feet. Its construction will be modern in every respect.

The company contemplates extensive improvements to its system, which will include reconstruction of many lines, and the installation of a considerable amount of underground and aerial cable. A central energy switchboard of standard construction will enable the company to give excellent service to its subscribers.

BUFFALO BELL COMPANY LOSES LARGE CONTRACT.

TAKING advantage of the recent expiration of its sub-license contract with the Buffalo Telephone Company, the Darien Telephone Company, of Darien, N. Y., has entered into a contract for long distance service with the Inter Ocean Telephone & Telegraph Company. Each subscriber will be enabled to call Buffalo and Rochester direct over the Independent lines, and will receive the benefit of connections to a large number of subscribers of other local exchanges in nearby towns.

LEXINGTON TO HAVE A NEW POLICE CALL SYSTEM.

FORTY police telephones connected with a central office have just been installed in Lexington, Ky. The system will not only allow the central office to keep track of the policemen, who are expected to report every hour, but it will enable any one at the station to summon all the members of the force in about three minutes. It is expected that the new telephones will render the work of the men more efficient.

EXCELLENT DEVELOPMENT IN LEE COUNTY, ILLINOIS.

FROM Dixon, Ill., comes the usual report of rapid growth for Independent companies. About one year ago the Home company commenced giving service with 700 subscribers connected to its new plant. At the present time it has 1,130, an increase of over 60 per cent., with orders for 25 telephones, which have been so recently received they could not be installed. To the switchboard 240 lines have been recently added, although the original installation was intended to provide for all growth expected for some time. General satisfaction prevails amongst the company's subscribers.

New lines are being built out of the village in different directions, and trunk lines to various neighboring points will provide a means for still further increasing the value of this system, which has so thoroughly attained the approval of the people in the town which it serves.

REMEMBER
You Were At the Mercy of a
Grinding Monopoly Once
With Their
High Rate and Generally
Poor Service.
IT'S DIFFERENT NOW.

Every Fight the People Have Made for Low Rates Has Been Fought Through the Medium of the INDEPENDENT SERVICE.

Do You Know There Are 90,000 INDEPENDENT TELEPHONES in Western New York That Can Be Reached Over No Other System?

Nearly Every Town, Village and Hamlet Is Enjoying INDEPENDENT SERVICE.

The Growth Has Been TREMENDOUS.

Rates Have Been REDUCED.

Service Been Made PROMPT AND RELIABLE.

Everybody Has An INDEPENDENT TELEPHONE.

ISN'T IT SO?
And
We Admit
WE ARE RESPONSIBLE.

The First Part of this Advertising Folder, Furnished by Wm. A. Wadsworth of the Inter Ocean Telephone & Telegraph Company, Buffalo, N. Y., was Reproduced in our Issue of May 19th.

INQUIRING MANAGER GETS IT STRAIGHT.

NOT long ago the district manager of the Bell Telephone Company operating in Rochester, N. Y., believed that his company was trying so hard to make up for past delinquencies that people ought to be pleased with its service. So he sent out many copies of a letter reading as follows:

Mr. ————, City.

Dear Sir: Mr. ————, our contract manager, has again reminded me that he has addressed a number of communications to you concerning the Bell telephone and its installation in your residence. He also tells me that he has not been, so far, favored with a reply.

As I must consider the matter of present, and very real, importance, not only to us but to you, I am taking it up in this more personal manner to ask if you will be kind enough to state your opinion concerning the (Bell) telephone and its desirability as a residence convenience.

There has been a most gratifying growth in the number of our subscribers in Rochester, until every district of the city, all kinds of shops and business places, and all classes of Rochester's citizens are thoroughly well represented. This growth has been due, in some measure to increasing knowledge of the convenience the Bell telephone affords; but I like to think that, in part, it is due to the better Bell conditions now prevailing in Rochester, to the promptness with which every telephone improvement has been added to our equipment here, and to the careful, vigilant manner in which all the requirements of our subscribers have been met.

It may be that you would prefer to express by word of mouth the opinion I seek. In that case please use the enclosed card addressed to me and I will personally see that it has immediate attention.

Thanking you in advance for your courtesy and attention, I am Yours very truly,

Rochester District Manager.

As was to be expected, at least one of the men who received one of these "form" letters had the courage of his convictions, and here is the decidedly straight and forcible reply he made:

June 14, 1906.

———— Esq., District Manager,
Bell Tel. Co., Rochester.

Dear Sir: I have your communication of June 4th. It is true, as you state therein, that I have received a large number of communications from you concerning the installation of a Bell telephone in my residence and that I have never replied to any of those communications. I think my refusal to reply should be regarded as a plain indication that I do not care for your telephone. A refusal to reply to a long series of communications would ordinarily indicate that those communications contained nothing of interest to the party to whom they were addressed.

You next ask if I "will be kind enough to state your (my) opinion concerning the Bell telephone and its desirability as a residence convenience." I believe it is commonly conceded that an opinion founded upon actual experience is entitled to some weight. I used the Bell telephone in my house for a number of years. I paid an exorbitant rate, ninety-five dollars per year. The service rendered was absolutely abominable. I seldom used the phone without being strongly tempted to order it out of my house. I have always felt that the money I paid your company was wholly wasted. There is a maxim to the effect that "a burnt child dreads the fire." That is particularly applicable to my experience with the Bell Telephone Company.

There are some other suggestions in your letter to which I might properly reply, but I think the foregoing will sufficiently indicate my views.

Yours very truly,

That's good! It ought to "hold him for a while."

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GRAY PAY STATIONS PAY

WHEN JOHN WANAMAKER HAS

1600 INSTALLED IN ONE STORE IN PHILA. YOU KNOW JOHN KNOWS.

You Can Depend on Grays, As We Don't Have Levers, Springs, Etc.

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

LARGE CATALOGUE 1906
No. 10 SHIELD Automatic

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

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WANTED—Position as manager of a good exchange. Have had over 5 years' practical experience and am graduate in telephone engineering. Can furnish best of references. Address, Box 632, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 632

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IN THE OPERATING FIELD

STEADY PROGRESS AND IMPROVEMENT IN SERVICE OF JOPLIN INDEPENDENT COMPANY.

NUMEROUS instances of expansion and important reconstruction characterize the growth of the Home Telephone Company, of Joplin, Mo., during the past year. Theodore Gary, as President and Manager of this company, has succeeded in building up an extremely well developed and efficient system operating in Jasper County, with exchanges at Joplin, Carthage, Webb City, Carterville and Purcell, of which the four latter have been added since the last convention.

Service is given to 4,500 subscribers, of which 2,200 are in Joplin, 1,300 in Carthage, and the remainder divided between the other three towns. Service from 13 toll stations connected with the company's lines is given, and it also has 250 rural line subscribers, of which about 70 per cent. have been added within a year. A considerable toll line plant is in service. Forty-four miles of new line have been constructed since the early summer of 1905. A great deal of aerial cable of different sizes has been installed, bringing the total number of miles in the several towns up to 40. Reconstruction and extensions for new subscribers has caused the building of 15 miles of this class of work during the past twelve months. It is regularly interchanging service with the Kinloch Telephone Company, of St. Louis; the Kinloch Long Distance Company, the Kansas City Home Telephone Company, Kansas City, and the Galena Telephone Company, at Galena.

VOLTAGE INDICATING DEVICE FOR SELECTIVE RINGING GENERATORS.

By Edward B. Jackson.

IN exchanges where selective ringing is used upon subscribers' lines nothing is more important than that the voltage of the ringing generator should be kept constant. Where the machine is run from a source of power which is fairly steady, but subject to changes in voltage which when established continue for a reasonable length of time, it is easy to regulate the voltage of the generator by keeping a close watch, and making suitable changes in the position of the rheostat.

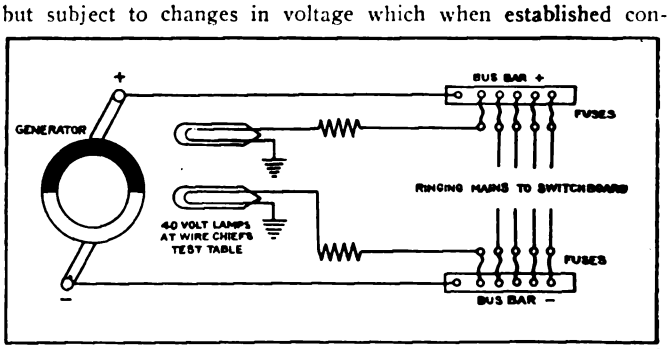

Fig. A. Connections of lamps for indicating voltage of generator for selective ringing.

A method of observing the variation which has been found to give very good results consists in the employment of lamps, so placed as to be constantly under the observation of the wire chief. For this purpose two switchboard lamps should be connected, one to the positive lead and the other to the negative lead, as shown in Fig. A, resistance being inserted between the lamp and the ringing main. These lamps should be mounted upon the wire chief's test table, or adjacent to it, in such a way that every time he looks up his attention may be attracted to them. He soon becomes accustomed to make observations from time to time, and the slightest variation in pulsations or brilliancy of the lamps will be observed. Proper action may then be taken to regulate the speed of the generator.

It may be objected that the constant use of a lamp will cause it to burn out within a few days. The author, however, has had two [illegible] lamps connected through a 400 ohm resistance, and these have been burning steadily for a period of two months and are still as bright as ever. The amount of current consumed is very small.

OVER SIXTY PER CENT. INCREASE MADE BY INDEPENDENT COMPANY IN DES MOINES.

SEVENTEEN hundred and forty-eight subscribers, bringing the total number connected to its exchange at Des Moines, Ia., up to 4,643, have been added by the Mutual Telephone Company during the past year. This company covers Polk County. Nearly all the subscribers are located in the city, only one hundred being connected to rural lines. The distribution of the plant is chiefly effected by means of aerial cable, of which there are 42 miles, the greater part having been in service since the plant was originally built. There are, however, 3½ miles of underground cable for carrying the larger leads. Business is regularly interchanged with the Southern Iowa Tel. Co., the Hawkeye Tel. Co., Des Moines; Boone County Tel. Co., Boone; Jasper County Tel. Co., Newton; Knoxville Tel. Co., Knoxville; while the toll companies supply service to nearly all points in Iowa.

The management is in charge of J. S. Bellamy, President; J. C. Hume, Secretary; L. M. Graves, Treasurer, and R. A. Walker, Manager. Provided with an efficient plant, the company is giving service the character of which may be readily appreciated from the figures showing the great increase in the number of subscribers.

REPRESENTATIVES OF LARGE INDEPENDENT INTERESTS FORM ASSOCIATION IN NEBRASKA.

AT a meeting of representatives of about a dozen Independent telephone companies of the southeastern section of the State held recently at Lincoln, the first division of the Nebraska Independent Telephone Association was formed. The following counties were represented in the meeting: Cass, Lancaster, Washington, Douglas, York, Saline, Gage and Seward. Sarpy and Fillmore counties are included in the district, but were not represented in the meeting. The total number of Independent telephones in the district is about 17,700.

The following officers were elected: President, T. H. Pollock, of Plattsmouth; vice-president, C. W. Nunemaker, of Tobias; secretary-treasurer, R. E. Mattison, of Lincoln. It was decided to issue a directory immediately, containing all the telephones in the district. The district will soon be given direct connection with Kansas City, St. Louis and other large cities in the southeast. A line is now being built from Lincoln to Falls City, and this will be connected with the lines running to Kansas City. It was announced that the association will continue to fight for entrance into Omaha.

NORTHEASTERN MAINE HAS DECIDED TO SUPPORT AN INDEPENDENT TELEPHONE COMPANY.

STRONGLY intrenched in the ground which it has so long held successfully, the Bell company has bitterly opposed the attempt of the Independent Telephone Company, of Houlton, Maine, to obtain a franchise in Fort Fairfield in the northern part of Aroostook County. However, the desired permission has at last been obtained, and work on the system will at once be started. This is an entering wedge, and the company intends to push business into that section vigorously. The country which will be opened up to the Independent interests has some of the richest farm lands in the State, and the service will be much appreciated by the rural population. The hearty support of the people has been won by the Independent company, and its progress from now on, although it will no doubt be bitterly opposed, is expected to be more rapid than it has been in the past.

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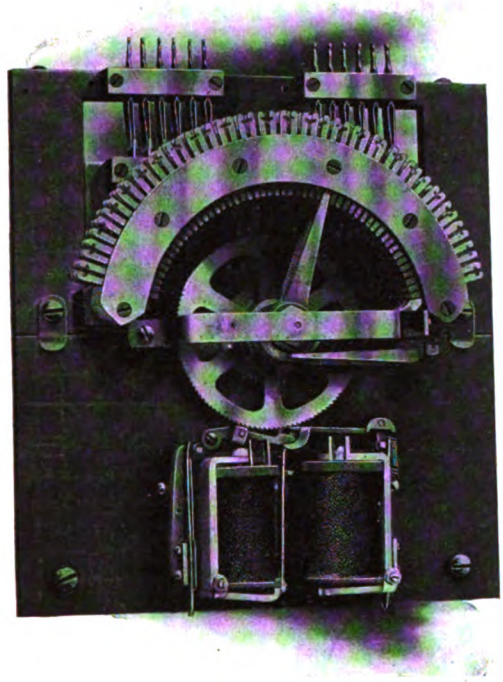

A GENTLEMAN prominent in the Independent operating telephone field, and a telephone engineer, recently wrote us, "I wish to again thank you for the pleasant trip, and the privilege of seeing your apparatus, which I consider the most revolutionary of any yet produced in the telephone business." He voices the sentiment of all who have seen it.

Our system is simply perfection in perfect simplicity. We have, as pronounced by prominent telephone engineers, a thoroughly complete, simple and perfect system, by which we do automatically everything necessary in a thoroughly up-to-date telephone system; a number of things never before thought possible in either manual or automatics, and many things which cannot be done manually. We use less switches and parts than any other system.

We can change your present central energy manual system to automatic without the necessity of changing the telephones. This is an enormous saving, and it will pay you to investigate.

We install exchanges of any capacity.

Write us for our pamphlet No. 666, which describes our system.

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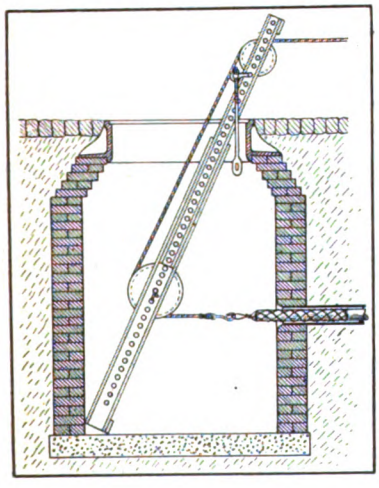
IMITATION is the sincerest flattery. Others have tried to imitate our **"Gem" Wire Grip.** The tremendous number of orders received since January 1, 1906—being over 3,000 more up to date than we received during the whole year o 1905—makes us feel that our device has passed from the experimental stage. We can offer no better testimonial than this, and feel positive that nobody else can.



All large telephone and power companies are now using our **"Gem" Wire Grip** to the exclusion of all other methods, thus its practicability is assured.

We solicit your inquiries.

This illustration shows our **"Rigid" Uprights,** which are adjustable, our **Mul Type Sheaves,** made with curved rims, and our **"Perfection" Upright Clamp,** which obviates the necessity of kick pieces at the bottom of the well. Also the application of the "Gem" Wire Grip.

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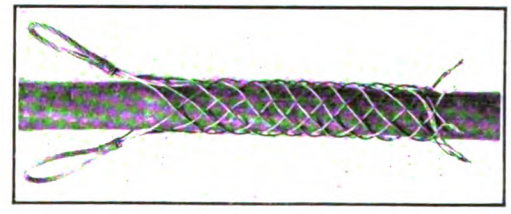
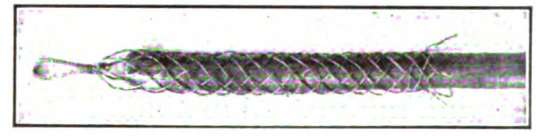
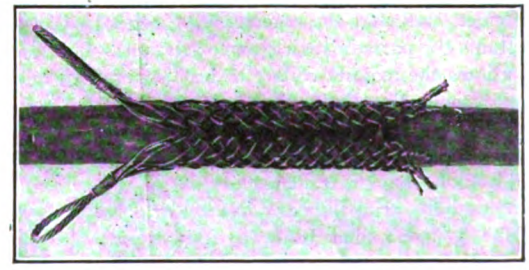


DOUBLE EYE "GEM" WIRE GRIP
For Aerial Cable and Other Uses



SINGLE EYE "GEM" WIRE GRIP
For Aerial or Underground Cable



SPLIT "GEM" WIRE GRIP
It Displaces the Half Hitch of Marline for Taking in Slacks

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TELEPHONE PATENTS

RECEIVER HOLDER.

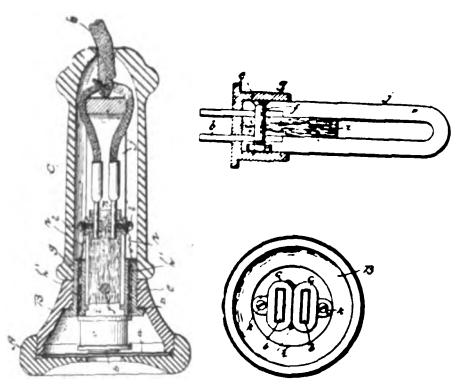
Casper Zimmerman, Aberdeen, So. Dakota, patents (No. 820,463; dated May 15, 1906; filed November 4, 1905; serial No. 285,901) a receiver holder.

The object of this invention is to provide a device which, while holding a receiver to one of the ears of the person using it, will exclude all noise from the other. It consists of a semi-circular band to one end of which is attached a clamp to hold a receiver, while the other end is provided with a pad that presses against the ear.

TELEPHONE RECEIVER.

Charles T. Mason, Sumter, S. C., patents (No. 823,061, dated June 12, 1906; filed March 17, 1905; serial No. 250,524) and assigns to the Sumter Telephone Mfg. Company, Sumter, S. C., a telephone receiver.

Improvements in the method of manufacturing telephone receivers are claimed for an instrument characterized by a magnet structure moulded in a soft metal section, which is screwed and cemented into the cup forming part of the receiver casing. The magnet is thus rigidly retained, and the casing is completed by a removable cap. Referring to the drawing it will be seen that cup B supports the magnet structure and forms a rigid and permanent union therewith, and thus avoids the necessity for separate cup and casing sections. Around the magnet structure is moulded a block *e* of soft metal, in which the magnet structure is rigidly fixed. The block *e* is threaded and secured into the cup B, and has a projecting portion G upon which the handle C is screwed. In assembling the parts a small space *p* is left between the ledge at the front end of the block *e* and the bottom of the cup to allow of the adjustment of the magnet structure to bring the pole piece in proper relation to the face of the cup and con-



sequently to the diaphragm. This space is filled with a suitable cement, and after the receiver has been adjusted this permanently retains the parts in their proper relations. Unloosening the screws *l* allows the magnet coils *c* to be disconnected and removed without unsoldering their wires.

PORTABLE POTENTIAL INDICATOR.

John B. Taylor, Schenectady, N. Y., patents and assigns to the General Electric Company, New York, N. Y. (No. 822,319; dated June 5, 1906; filed June 10, 1905; serial No. 264,606), portable potential indicator.

This invention consists of a device for indicating whether or not an electrical conductor is alive. In Fig. 1 it will be seen that the device includes a hard rubber handle in which is inserted a rod, 2, of metal, having a tubular extension or sleeve, 3, which projects beyond the end of the handle. Within this is a glass tube 4, which is hermetically sealed at each end and contains an inner tube 5. A metal electrode 6 projects beyond the end of the tube at 7. The space between the inner and outer tubes is filled with a liquid insulator 8, such as gasoline, benzine, etc., having

Fig. 2.

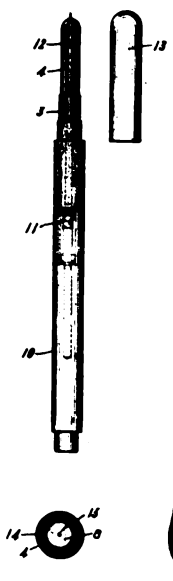


Fig. 1.

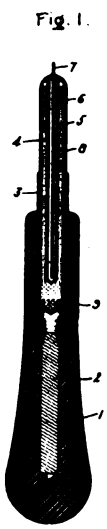
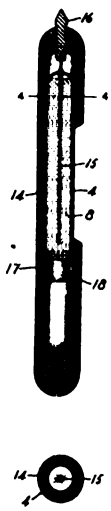


Fig. 3



in suspension in it some powerful substance such as sulphide of tin or aluminum powder. A small quantity of mercury 9 provides a means for scouring the inner walls of the tube upon agitation. In Fig. 2 is shown another form of the device, in which the electrode is in the form of a strip 12 directly in contact with the liquid. In Fig. 3 the tube is enclosed in a sheath 14 of hard rubber and electrode 15 is directly immersed in the liquid. In operation the device is held in the hands of the operator and the projecting end of the electrode is approached to a conductor. If the latter is charged the floating particles in the liquid become electrified inductively and are attracted to the inside of the glass tube and to the electrode, or the outside of the inner glass tube if one is used. In the form show in Fig. 1 the device is virtually several condensers in series. The motion of the conducting particles causes a change in the appearance of the liquid and powder, which is an indication that the conductor is charged.

VISUAL INDICATOR.

Frank R. Lay, Greenfield, Ind., patents (No. 820,213; dated May 8, 1906; filed April 22, 1905; serial No. 256,882), and assigns one-half to Walter W. McCole, Greenfield, Ind., a visual indicator for telephones.

The object of this invention is to visually indicate whether or not a telephone bell has been rung in the absence of a subscriber; and, in case there should be a plurality of telephones, to indicate which one was signalled, to avoid possible confusion arising from the ringing of two bells. This the inventor accomplishes by means of electromagnets connected with each circuit and contained within a case on the front of which are pointers. When a signal is received over a line the associated magnet is energized, causing it to operate its pointer.

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To Unnecessary Clerks	?	**Who**
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SECOND ANNUAL

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SWEDISH AMERICAN COMPANY'S PROGRESS.

AMONG the leading exhibitors at the convention was the Swedish-American Telephone Company, which occupied Room 612. The company displayed in a unique and interesting manner a complete line of its well known product, and it is safe to say that the company did its share of the business.

The company also entertained a number of visitors at its new factory, which is located at No. 1760 East Ravenswood Park Ave., and it was agreed that the Swedish-American company has one of the most complete and up-to-date plants of this character in existence.

Its new factory building, which it owns and occupies exclusively, contains about 200,000 feet of floor space, all of which is devoted to the manufacture of telephone equipment.

A number of the company's traveling salesmen were also in attendance at the convention, renewing old acquaintances and making many new ones. Among them were Mr. W. O. Rhode, who has charge of the branch at Kansas City; Mr. F. M. Ferguson, who is in charge of the branch at Omaha; and Mr. C. L. Ward, who has a branch office at Fargo, N. D. Also Mr. J. A. Russell and Mr. Fred Seeley, traveling representatives.

The Swedish-American Company has maintained its reputation for quality and up-to-date displays. It reported the closing of a number of good size contracts, among them being one for The Enterprise Telephone Company of Phillipsburg, Kans., for a 300 line equipment complete; 100 line equipment complete for the Mercer Company at Bryant, Ind.; 100 line equipment for the Henry Union Telephone Co. of Henry, S. D. Also 200 line equipment for the North Western Ind. Tel. Co. of Lowell, Ind., and numerous other smaller orders.

THE DEAN ELECTRIC CO., Elyria, Ohio, among others, reports orders from the Inter-State Telephone Company, Little Falls, New York, to change a six hundred line board to Dean harmonic selective 4-party system, changing all the key shelves, keys and plugs and installing a Dean harmonic converter. Also the Shelby Telephone Company, Shelby, Ohio, has arranged for a fifteen hundred line multiple switchboard, equipped for five hundred (500) local and sixty (60) magneto lines. This switchboard is to be completely equipped for Dean harmonic selective party line system, with power plant and duplicate harmonic converters.

A NEW AUTOMATIC SYSTEM.

A YEAR or two ago, when automatic telephony was beginning to receive serious consideration at the hands of the telephone public, Mr. J. W. Lattig and Mr. Chas. L. Goodrum, then of Philadelphia, Pa., the General Superintendent and Chief Engineer respectively of an Independent telephone company operating upward of two hundred exchanges, became associated in the development of a system in which their constant aim has been to produce thoroughly simple and reliable apparatus and circuits. Later Mr. B. G. Dunham, formerly of the Automatic Electric Co., of Chicago, became associated with them, and the present system, which is the result of their combined efforts, has resulted in the incorporation of the American Automatic Telephone Co., of Rochester, N. Y., whose advertisement appears in this issue. The company has a capitalization of $1,500,000.

The officers of the company are: President, Hon. John Raines; vice-president and general manager, Mr. J. W. Lattig; secretary and treasurer, Mr. B. J. Williams.

The directors are: Hon. John Raines, President pro tem of the New York State Senate; J. W. Lattig; B. J. Williams, President of the First National Bank of Shelby, Ohio; Alvarc L. Thompson, of Ingmire & Thompson, Rochester; Geo. R. Raines and Joseph R. Webster, of the law firm of Webster, Meade, Straus & Raines; H. H. Stebbins, Jr., a rising young business man of Rochester; H. H. Hutchinson, a retired business man; and John F. Brayer, a director and superintendent of the Co-Operative Foundry Co., and treasurer of the Mechanics Institute of Rochester.

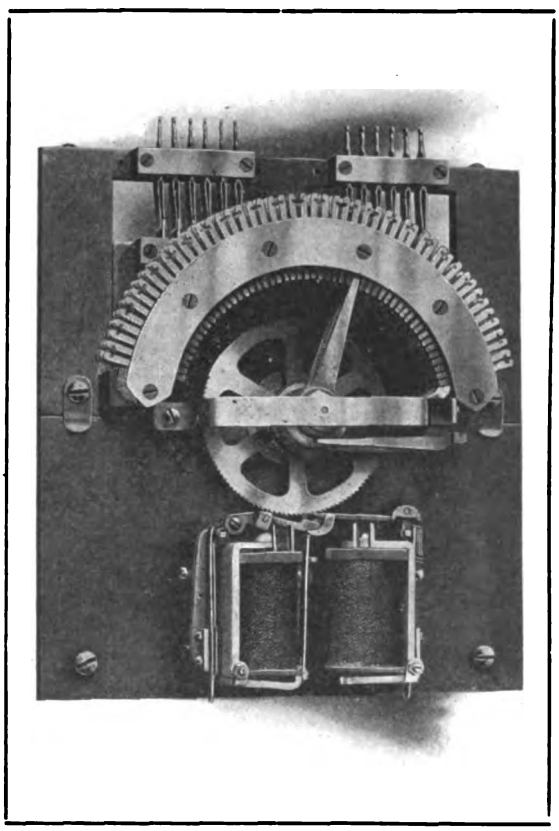

Fig. 1. Switch used in the system of the American Automatic Telephone Company.

The switches (Fig. 1) are entirely different from any heretofore placed on the market; the electrical part consisting of but two magnets, one driving the switch forward to any selected point, and the other serving as a release magnet to restore the switch to normal when the receiver is hung up. The mechanical movements are extremely simple, and are the same throughout the system. All parts are interchangeable. Each switch has but one ratchet wheel and two pawls, which are made of hardened steel, thus insuring great durability. The great simplicity is accounted for by the fact that most of the control is accomplished electrically and not mechanically, as has been the custom; also that all movements are in one plane—the horizontal. No fine and exact adjustment of the wipers is required, because they are always in engagement with the bank contacts over which they sweep to select a line.

The bank base is equipped with female jacks and the switch base with male jacks, which makes possible a replacement of one switch by another within a couple of seconds.

There are no conducting cords to become entangled with the switch mechanism, as the bank contact wipers are supplied with current by metal feeders, or brushes.

The switches are mounted on angle iron frames, each frame built to accommodate twenty, and so arranged that the capacity of any exchange can be increased from time to time by adding sections in sectional bookcase form. These sections are enclosed by cabinet work and glass, and are dust proof.

Each subscriber's line, instead of an individual switch, is represented in the central office by two relays (Fig. 2), the combination being similar to the line and cut-off relays used in manual practice.

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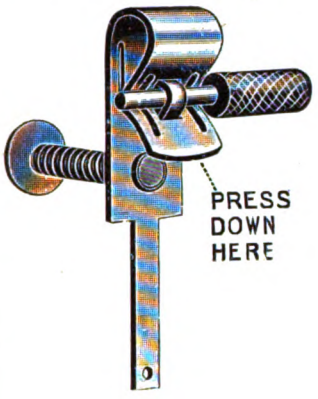
A NECESSITY



On distributing frames, dry batteries, and wherever permanent or temporary electrical connections are made

THE NO. 11

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was made to the special order of a large telephone company. It has an extra long lug and is well suited for use on distributing boards and other places about an exchange. Manufacturers of the leading dry batteries will supply their cells fitted with Fahnestock post without extra charge.

We carry a number of different styles in stock. Write for our new booklet.

Special designs made to order.

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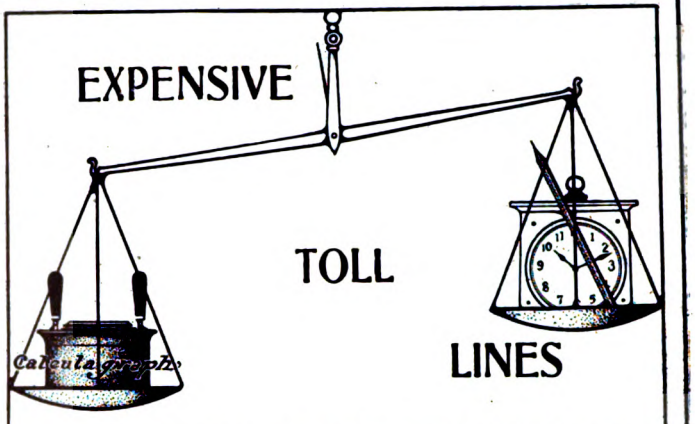

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must be worked to their fullest capacity in order to secure a maximum return on the invested capital.

The Calculagraph

will increase the capacity of your toll lines. It counts every second the line is in use and prints the elapsed time and time connected on a card.

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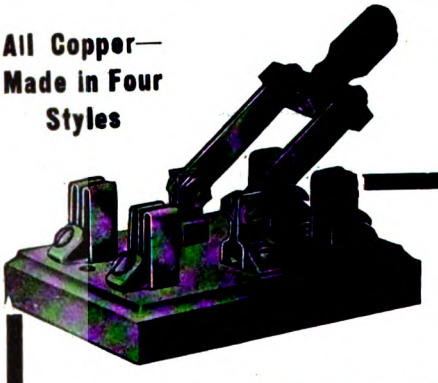

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List Price.....$ .54
Discount 50%

If you are starting a new company, you don't need an expensive switchboard. We have devised a simple system of double throw knife switches that will do the work quickly and well.

NO DROPS NO JACKS

***Just* The Trumbull Switch**

with the "U" clip that insures perfect contact.

When the growth of your exchange requires it, you can get a switchboard and use the old switches for innumerable other purposes.

Write for diagram and information.

TRUMBULL ELECTRIC MFG. CO.

618 Woodford Ave., PLAINVILLE, CONN.

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IN THE MANUFACTURING FIELD

All central office apparatus has lamp supervision. A lamp associated with each switch, and numbered to agree with the switch to which it pertains, is mounted on the wire chief's desk. As soon as any switch starts to operate, its lamp lights and burns until it has performed its proper function, thus trouble of any sort will immediately become evident to the wire chief.

The sub-station selector on the telephone, Fig. 3, is a remarkably simple piece of apparatus. Special effort has been exerted in this direction because it is the only piece of equipment placed beyond the sight of the central office wire chief. It is therefore exceedingly desirable that it should be simple, durable and reliable, thereby avoiding frequent inspection, adjustment and repairs, as such trips are expensive. It consists merely of a case, a dial, one gear wheel, one contact wheel, a governor, and one single electrical contact normally closed. This great simplicity is largely due to the fact that the ground is not used. It is self-contained, and can be attached to any standard central energy wall or desk telephone. There is a lamp attached to the sub-station set, receiving its current from the central office over the telephone wires, which throws a light on the dial as soon as the subscriber removes his receiver from the hook, thus enabling him to call at any hour of the night, or to find numbers in his directory without first illuminating the room.

The method used in calling a sub-station is entirely different from any other. It is what is called a hyphen number system. For example, 3333 would be called 33-33. By the old method to call 3333 would require four movements of the dial, while in the hyphen number system but two movements are necessary. This method is used not only to reduce the number of operations, and the length of time required of a subscriber to make a call, but to enable the subscriber to more easily remember the combination.

The hanging up of the receiver restores all switches to normal instantly, and this will occur whenever the circuit is opened at any stage. Successive calls may be made without the necessity of the calling party first hanging up, that is to say, if the called party hangs up, the calling party is instantly ready to make another call, or vice versa.

Briefly stated, some of the points of the system set forth by the company are: Central energy; party lines, selective ringing with lock-out; automatic pay stations, arranged to: Discriminate between rates, measure time for both original and fractional periods, and compel the payment of proper amounts if conversations exceed predetermined period, return money if party called fails to answer, return change if more coins are deposited than is required by time of conversation, and register in central office number of coins collected by each pay [illegible] affording a check on collections; simplest circuits ever produced; disconnections are instantaneous; no use of ground; metered service; automatic fire alarms, district messenger or police patrol service, without additional exchange equipment; secret service; continuous service always uniform.

Further information will be given by The American Automatic Telephone Company, Rochester, N. Y.

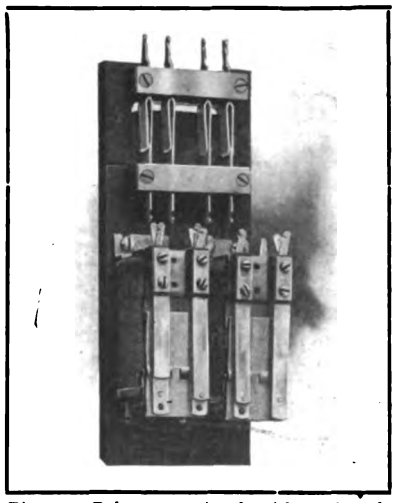

Fig. 2. Relays associated with each subscriber's line in new automatic system.

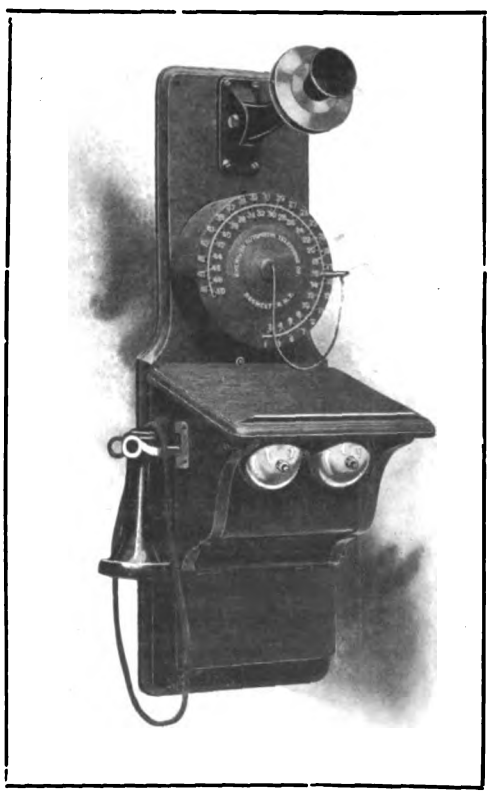

Fig. 3. Subscriber's telephone, with selector supplied by the American Automatic Telephone Company.

THE ELECTRICAL TRADES EXPOSITION COMPANY, Chicago, Ill., has already made arrangements for the allotment of a large amount of space for next winter's electrical show. The exhibition will surpass in variety and extent even the immensely successful show held last January.

THE MOUNTAIN STATE ELECTRICAL COMPANY, 911 Market street, Wheeling, W. Va., has put upon the market a lock-out system for central energy party lines which is extremely simple. The company claims that this will absolutely lock out every party on a line except the one talking. The essential apparatus includes no central office equipment, being simply attached to the subscriber's instrument. Its operation depends upon principles worked out by Arthur F. Poole. Its value is said to have been thoroughly demonstrated, and the manufacturers will be pleased to send further information to all inquirers.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., reports that since the general recognition of the scarcity of suitable pole material by telephone companies large increases in sales of its preservative compound, Avenarius Carbolineum, have been made. As it is low in cost and easily applied it secures long life to poles of a comparatively low priced wood, and enables important economies to be effected in line construction.

THE WESTON ELECTRICAL INSTRUMENT COMPANY, Waverly Park, Newark, N. J., has this year taken its Mr. Caxton Brown into the Newark factory, as secretary of the company and sales manager, and in his place as manager of the New York office has put Mr. Stanley Brown.

In connection with this office there has been installed a Repair Department, whose duty it is to take care of the repairs in the metropolitan district, and particularly to look after emergency calls.

This new feature has been very warmly welcomed by the many users of Weston Instruments in New York City, and has enabled the manufacturer to insure a higher degree of satisfaction to his customer than ever before.

The company is very much pleased with the present instrument outlook, and is exceedingly busy preparing new models for measuring apparatus to meet the wider demands of modern electrical requirements.

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WIRELESS TELEPHONY

is probably pretty far ahead, but

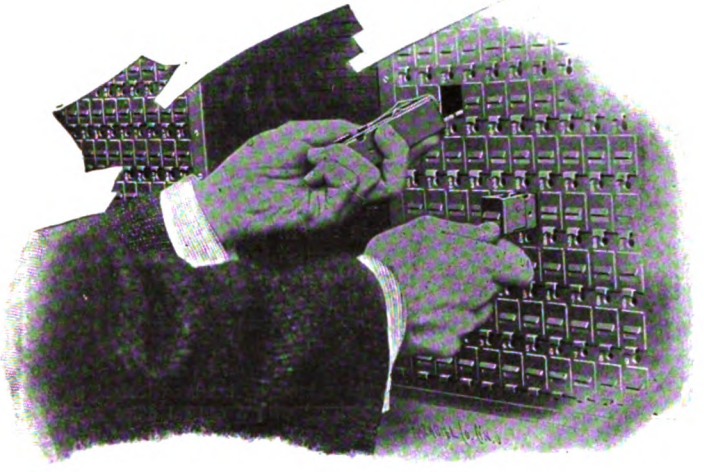
THE UNITYPE

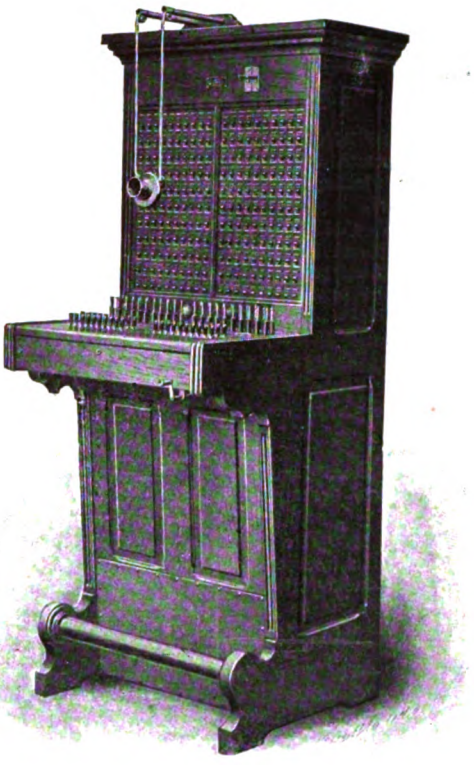
Pat. April 25th, 1905

is the most up-to-date thing now here!

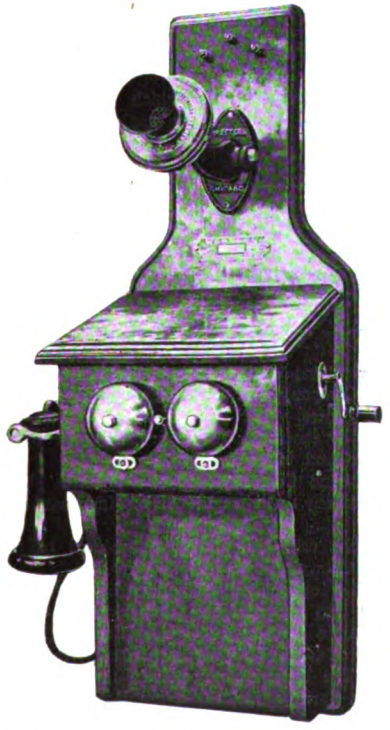
SAY!!

Let us tell you MORE about this switchboard. If you don't we both lose money.





THE SUMTER TEL. MFG. CO., Sumter, S. C.



Bridging Telephone.—Type M.
This style of cabinet also made into:
3-Bar, Series, Type "K"
4-Bar, Bridging, Type "L"
with any ringer resistance desired.

Western Pioneer Telephone

Five-Bar Bridging

Our **New Western Pioneer** telephone can be furnished for all classes of special **service** such as **ring through, non-interfering, divided circuit,** central **checking party line** and in fact can be used where any generator call telephone is now being used. The apparatus used in this instrument is of **New Western design.**

The **common battery type** of **magneto telephone** is becoming popular. The cabinet is compact and neat in appearance, all parts are **conveniently mounted,** the wiring is simple and the cabinet will accommodate a **three, four or five-bar generator.** We manufacture all of the parts used in this instrument. When the upper compartment is open the generator, ringer, hook switch, induction coil and receiver binding posts are exposed. When the battery box is removed by sliding downward, the batteries and battery connections are exposed.

WRITE FOR OUR GREEN BOOKLET

WESTERN TELEPHONE MFG. CO.

"The Pioneer Independent Telephone Factory"
Established 1893

58 W. Jackson Boulevard, Chicago

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THE WEEK'S MESSAGES

NEW COMPANIES.

BUFFALO SPRINGS, COL.—The Buffalo Springs Telephone Company has been incorporated with a capital stock of $2,000. Arthur Brady, J. J. S. Harvey, J. V. Fleming, W. L. Shane, G. L. Snyder, of Akron, are among the incorporators.

LONGMONT, COL.—The Northwestern Telephone Company has been organized to operate in Boulder, Routt, Larimer, Arapahoe and Denver counties, with headquarters at Longmont. The capital stock is placed at $50,000, and the incorporators are M. H. Spere, J. K. Brown, E. V. Bowles, J. A. McCollister and W. W. McCollister.

SHELBYVILLE, IND.—A new Independent Telephone Company is being organized at Shelbyville to take the place of the one which recently sold out to the Bell Company. The company is being financed and organized by Charles H. Tinall, attorney, of Shelbyville, and Charles L. Wedding, of Indianapolis.

EDGEWOOD, MO.—At a meeting held by the citizens of Edgewood it was decided to organize an Independent company to be known as the Pike County Telephone Company. The company will construct lines in Pike County.

HANNIBAL, MO.—The New Canton, Cincinnati & Hannibal Telephone Company has been incorporated and will construct a line from Rockport to Cincinnati Landing, New Canton and Hannibal. The principal offices of the company will be located at Hannibal. Those interested in the formation of the company are Munger Bros. and J. N. Baskett, of Hannibal.

HOLT, MO.—The Clay County Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are W. H. Smith, J. A. Eby, G. W. Sexton and others.

HUMBOLDT, NEB.—The City Mutual Telephone Company has been incorporated with a capital stock of $25,000.

MARTEL, NEB.—The Martel Farmers' Independent Telephone Company has been organized with a capital stock of $500. The officers are Albert Egger, president; J. A. Sittler, vice president; W. H. H. Moore, secretary; E. Bohmont, treasurer.

STELLA, NEB.—The Farmers' Mutual Telephone Company has been organized and has elected the following officers: W. J. McCray, president; H. W. Lowe, secretary; Morris Norris, treasurer.

OSWEGO, N. Y.—A new Independent Telephone Company is to be formed at Oswego with a capital stock of $125,000. Those interested in the formation of the company are J. F. Stockwell, manager of the Syracuse Independent Company; Alexander Cowie, secretary of the Rochester Company, and a number of the former stockholders of the Ontario Telephone Company.

BRAZIL, N. D.—The Brazil Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are C. W. Glasgow, C. L. Buckholder, Fred Rousig, C. J. Kennedy, Joseph Barr, A. B. Lose, Brazil, N. D.; Tom O'kendale, Rugby, N. D.

CINCINNATI, OHIO.—The Cincinnati Independent Telephone Company has been incorporated with a capital stock of $10,000. Among the incorporators are Charles H. Urban and Arthur R. Morgan, members of the Cincinnati bar; Edward Puthoff, a Price Hill capitalist; William Klussman and Geo. W. Griffith. The company expects to establish a telephone system in the towns outside of Cincinnati, although it is incorporated to do business in Cincinnati. It will establish exchanges to be operated in competition with the Bell Company at Reading, Wyoming, Hartwell, Lockland, Madisonville, Elmwood Place, St. Bernard and other points.

CINCINNATI, O.—The Fitzsimmons Independent Telephone Company, of Cincinnati, is to be incorporated with a capital stock of $100,000. Philip Fitzsimmons, formerly of the Fitzsimmons Mfg. Company, and other Cincinnati and Chicago capitalists are among the incorporators.

GROVER HILL, O.—The Farmers' Telephone Company has been incorporated.

IRONTON, OHIO.—A new Independent Telephone Company has been formed at Ironton to take the place of the Home Telephone Company recently acquired by the Bell Company. The company has been organized by the Ironton Merchants Association, and a franchise has been applied for.

OLD FORT, OHIO.—The Old Fort Mutual Telephone Company has been incorporated with a capital stock of $10,000. The following are the incorporators: R. G. Shannon, H. S. Fry, C. J. Fry, W. S. Beck and G. E. Zimmerman.

PORTSMOUTH, O.—The Home Telephone Company has been organized by the election of the following officers: William R. Fee, Milford, president; J. S. McKell, Chillicothe, vice-president; W. D. Tremper, Portsmouth, treasurer; E. E. Knox, secretary and manager.

SALEM, OHIO.—The New Cumberland Telephone & Telegraph Company has been incorporated with the following incorporators: W. S. Holloway, C. L. Smith, H. W. Young, R. V. Hampson, Albert Hayes and M. L. Young, all of Salem. W. S. Holloway, formerly superintendent of the Columbiana County Telephone Company, is to be manager of the company.

GRAND, OKLA.—The Day County Telephone Company, with a capital stock of $5,000, has been incorporated. Among the incorporators are J. P. Johnson, E. S. Sharp, E. L. Mitchell, W. H. Hauser, S. Crim, Jr., and T. C. Moore.

NEWKIRK, OKLA.—The Alpha Mutual Telephone Company has been incorporated by E. Lindsay and others.

HONESDALE, PA.—The Wayne Telephone Company has been organized in Dyberry township with a capital stock of $3,000.

BERESFORD, S. D.—Articles of incorporation have been filed for the Gothard Telephone Company with a capital stock of $25,000. The incorporators are C. W. Deane, Wm. Murray, G. D. Williamson, S. Wilson and John Landeen, all of Beresford.

COOPER, TEX.—The Delta Telephone Company, Cooper, Delta County, has been incorporated with a capital stock of $15,000. The incorporators are C. H. Reid, R. M. Connell and R. M. Walker.

LOIS, VA.—Articles of incorporation have been filed by the Lois Mutual Telephone Company. The capital stock is placed at $5,000 and the following officers have been elected: J. M. Price, president; J. E. Stively, vice-president, both of Bealeton, Va.; George E. Bain, secretary and treasurer.

STEWARTSVILLE, VA.—The Bedford County Telephone & Telegraph Company has been incorporated with a capital stock of $5,000.

DALLAS, W. VA.—A telephone company has been formed by the farmers residing in the Beham neighborhood with a central office at Dallas, where connections will be made with a number of other farmers' lines. The company expects to extend its line to West Alexander and possibly Claysville.

GILBERT, W. VA.—The Gilbert Telephone Company has been incorporated with a capital stock of $5,000 by the following incorporators: J. E. Stafford, J. E. Elkins, John W. White, J. M. White and F. S. Stafford, of Gilbert.

FRANCHISES.

RED BLUFF, CAL.—O. B. Wheeler and F. A. Graves have been granted a franchise to construct and operate a telephone system in Tehama County.

WOODSTOCK, ILL.—The Spring Grove Telephone Company, of Spring Grove, will probably make application for a franchise at Woodstock within a short time.

EAGLE BEND, MINN.—A. King, of Frazee, has applied for a telephone franchise at Eagle Bend.

RED LAKE FALLS, MINN.—The franchise for which the Tri-State Telephone Company, of Minneapolis, Minn., recently applied has been granted.

FINANCIAL.

GENEVA, NEB.—The capital stock of the Fillmore County Telephone Company has been increased to $100,000.

TECUMSEH, NEB.—The Johnson County Home Telephone Company has increased its capital stock from $50,000 to $100,000. The money will be used in establishing a complete county service.

COMBINATIONS.

FLORA, IND.—The Home Telephone Company of Flora has been acquired by the Flora Telephone Company and it is expected that much better service will be given in the future.

PRESTON, IA.—The Farmers' Organization has purchased the Nate Millhaem telephone lines at Preston and Miles for $10,500.

EDINA, MO.—The Edina Telephone Company and the Farmers' Line have consolidated. The new company will make many improvements in its system.

COOK, NEB.—H. F. Cannon has sold his telephone business to the Johnson County Home Telephone Company.

BRADLEY JUNCTION, PA.—The Independent Telephone Lines of Cambria County are to be consolidated into one company, to be known as the Northern Cambria Farmers Telephone Company. James Farabaugh, of Bradley Junction, has been made president; Wm. Krumenacher, vice president; Frank Westrick, treasurer. The lines incorporated in the new company are the Bradley Junction-Chest Springs line, the Cross Roads line and the Carrolltown-Patton line. A charter has been applied for, and the service will be much improved.

SOUTH BOSTON, VA.—The Dan River Telephone Company has purchased the South Boston Telephone Company from R. A. Perkinson. The system will be greatly enlarged under the new management.

SASKATOON, SASK., CAN.—J. C. Drinkle, of Saskatoon, and John Wilhe, Moosomin, Alb., have taken over the plant of the Saskatchewan Telephone & Electric Supply Company, and will overhaul the entire system.

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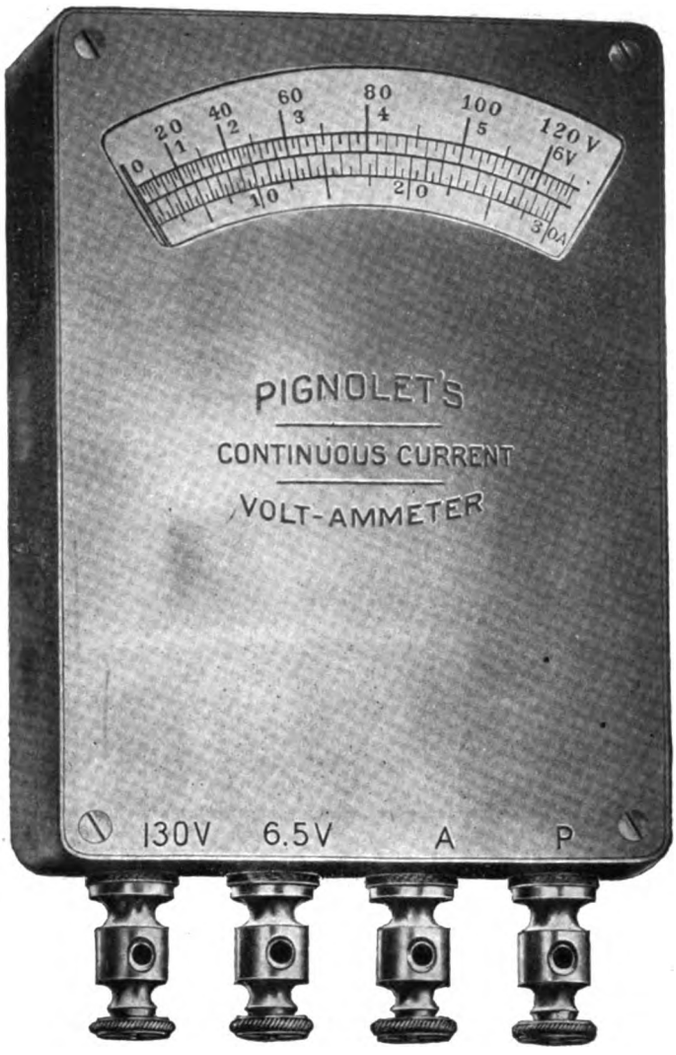

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If you use one of our voltmeters once, you will acquire the voltmeter habit and never give it up.

Do You Know

that the instrument shown on the right gives both volt and ampere readings?

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That our triple scale instruments will measure the voltage of a single cell or that of an electric light main?

That you can measure the resistance of your lines with it?

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Yet the cost is low and if you write us we will make a price that you can afford to pay.

LOUIS M. PIGNOLET, 80 Cortlandt Street, New York

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THE WEEK'S MESSAGES

ELECTIONS.

KEWANEE, ILL.—The Kewanee Home Telephone Company has elected the following officers: President, W. I. Hibbs; vice-president, F. A. Ellithorp; secretary and treasurer, A. C. Shoemaker; directors, J. N. Anderson, G. B. Thompson, J. A. Law, S. M. Parke and W. H. McMillen.

STORY CITY, IA.—The following officers have been elected by the Story City Mutual Telephone Company: A. M. Henderson, president; T. T. Henderson, secretary; B. R. Dawson, treasurer.

NORTH ORANGE, MASS.—The North Orange Telephone Company has elected the following officers: President, S. J. Oliver; secretary and treasurer, Adin Taylor.

LITCHFIELD, MINN.—At the annual meeting of the Litchfield Telephone Exchange Company the officers elected were: President, H. I. Peterson; vice president, G. H. Sullivan; secretary, T. F. McClure; treasurer, G. A. Settergren.

ST. PETER, MINN.—The Nicollet County Telephone Company has elected the following officers: P. P. Quist, president; M. B. Johnson, vice president; W. G. Lauman, secretary; F. M. Donahower, treasurer; C. C. Nelson, general manager.

BUTTE, MONTANA.—The Montana Independent Telephone Company has elected F. B. Moss, of Billings, first vice president; M. S. Largey, of Butte, second vice president; C. J. Kelley, of Butte, secretary and treasurer, and E. B. Jones of Salt Lake, managing director.

SCHENECTADY, N. Y.—The Home Telephone Company has elected the following officers: President, Chas. F. Veeder; vice president, Irving H. Griswold; secretary, F. M. Strong; treasurer, E. S. Kellogg.

PERSONALS.

H. S. KERBY has been promoted to the position of assistant superintendent of the Evansville district of the Cumberland Telephone and Telegraph Company.

E. E. MICHAEL has been appointed manager for the Northwestern Telephone Exchange Company at Mankato, Minn.

THOMAS B. PHILLIPS has been appointed manager of the Jackson County Home Telephone Company, at Jackson, O.

J. R. PORTER has been made manager of the Henderson, Ky., exchange of the Cumberland Telephone and Telegraph Company.

SAMUEL M. STRONG, who has recently resigned from the management of the Home Telephone Company of Schenectady, N. Y., to take charge of a branch of a banking house, will continue to hold the office of secretary of the telephone company.

H. B. TAYLOR, of Toledo, has been appointed Assistant Treasurer of the Federal and United States Telephone Companies, as well as Auditor and Treasurer of the Cuyahoga Telephone Company, with headquarters at Cleveland, O.

M. W. WATERS has assumed charge of the Consolidated Telephone Company's exchange at Scranton, Pa.

W. V. EATON has been appointed to a position in the construction department of the Northwestern Telephone Company, with headquarters at Minneapolis, Minn.

MISCELLANEOUS.

AVENUE CITY, MO.—The Avenue City Telephone Company has elected the following officers: Robert Archdeacon, president; T. J. Kelly, vice-president; E. D. Rucker, secretary; E. L. Schneider, treasurer.

MILWAUKEE, WIS.—The Milwaukee Independent Telephone Company has elected the following officers: President, H. D. Critchfield; vice-president, E. A. Wadhams; treasurer, Howard Greene; secretary, Clifford Arrick.

New Construction in the Field

MAHOMET, ILL.—The Mahomet Telephone Company is building a new line to Rising.

PLEASANT PLAINS, ILL.—The Boynton Telephone Company has under construction a new exchange at Pleasant Plains.

MEADOWS, IDAHO.—The Meadows-Warren-Roosevelt Telephone Company contemplates doubling its capital stock for the purpose of completing and extending its lines.

GARRETT, IND.—The Garrett Telephone Company will spend about $15,000 in increasing its plant, installing new switchboards and building large extensions to its lines.

NEW HAVEN, IND.—The Home Telephone Company is building 25 miles of new line for farmers in that vicinity.

RICHMOND, IND.—The Home Telephone Company is to install a complete, modern and up-to-date telephone system. It is planned to install new switchboards, telephones and other equipment to replace the present plant at Richmond.

WESTVILLE, IND.—The Westville Telephone Company will establish an exchange at Wanatah.

ARDMORE, I. T.—The Chickasaw Telephone Company contemplates many improvements in its system.

BODE, IA.—The Rural Union Telephone Company is to put in new switchboards at Bode and Bradgate.

BRONSON, IA.—A line from Bronson to Luton is being constructed by the Bronson Telephone Company.

IRVING, IOWA.—The Irving Telephone Company expects to extend and improve its system.

WAVERLY, IA.—The Corn Belt Telephone Company, which now has over 5,000 telephones in service, is building a number of farmers lines north of Waverly, around Tripoli and in the vicinity of Denver. The company also expects to complete its long distance toll lines from Sioux Falls, Sioux City and Council Bluffs on the west to Dubuque and Rock Island on the east.

SALINA, KAN.—The Salina Telephone Company is making arrangements for the construction of a new telephone exchange building at Salina.

NEWPORT, KY.—The Citizens Telephone Company is to place its wires underground in Newport.

CHINA, ME.—The Unity Telephone Company, of Unity, is building a line to China, Me.

LYLE, MINN.—The Interstate Telephone Company has installed an exchange at Lyle, giving connections with Austin.

HANLEY FALLS, MINN.—The Hanley Falls Telephone Company has been incorporated with a capital stock of $10,000. The officers of the company are I. Johnson, president; L. S. Orwoll, vice president; W. E. Hanson, secretary; H. M. Hanson, treasurer.

ROSEMOUNT, MINN.—The Star Telephone Company is building a number of rural lines.

LAMAR, MO.—The McGilvary Telephone Company, of Lamar, will commence the construction of two lines to Nashville in a short time.

VANDALIA, MO.—It is the intention of the Union Telephone Company to greatly improve its system, putting in new cables and making it strictly up to date in all particulars.

ANGUS, NEB.—The Independent Telephone Company, which is now completing a line between Angus and Edgar, expects to build two more new party lines out of Angus.

BLUE SPRINGS, NEB.—Numerous new lines are being constructed out of Blue Springs by the Farmers' Telephone Company.

ELGIN, NEB.—The Antelope County Mutual Telephone Company is to establish an exchange at Clearwater similar to the one at Elgin. It is also going to endeavor to secure a franchise at Neligh, with a view to establishing an exchange at that point also.

SOUTH OMAHA, NEB.—It is the intention of the Independent Telephone Company of Council Bluffs to build lines from South Omaha to Treynor and Bentley, also to Honey Creek.

TRENTON, NEB.—The lines of the Wray Telephone Company are being extended north and south of Trenton.

ASHLAND, N. H.—The Citizens' Telephone Company expects to build a line from Ashland to Holderness.

SCHENECTADY, N. Y.—The Home Telephone Company is planning extensive improvements in its system.

ATHENS, OHIO.—The Athens County Home Telephone Company is installing a new switchboard at Jerseyville, and making other improvements in its system.

TOLEDO, O.—The United States Telephone Company, of Cleveland, has decided to expend $200,000 for additional equipment and extension of its lines at Toledo.

MILLER, S. D.—The Ree Hills Telephone Company has under construction a number of farmers' lines.

WINNIPEG, MAN., CAN.—The Winnipeg Electric Street R. R. Company will install a telephone line between Winnipeg and Lac de Bonnet, a distance of about 60 miles. Wilford Phillips, general manager.

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KELLOGG "MICHIGAN WHITE" CEDAR POLES

THE poles we handle are all carefully selected, and are the best grade of stock.

All shipments are prompt, subject only to car supply.

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

We have recently published a little book giving some very valuable information about Cedar Poles. It contains Specifications, Inspection Comments, Shipping Data, Etc. "Yours for the asking."

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GLENN-KLINE LUMBER CO.,

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TOLEDO, OHIO — THE F. BISSELL COMPANY

MICHIGAN and IDAHO CEDAR POLES

The F. BISSELL CO. TOLEDO OHIO

POLES

30 and 25 foot lengths for rural telephone lines a specialty.

PORTER CEDAR CO., Saginaw, Mich.

CHESTNUT POLES

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Large Stock 16 to 25 ft. 4 to 6 in. Tops For Rural Lines

YARDS:
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WHITE CEDAR POLES

Buy from the Producers and Save Jobbers' Profits.

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Longest Lasting Best Grade

40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st
25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

Yards { Omer, Bay City and Boyne Falls

W. C. Sterling & Son Co., Monroe, Mich.

M. LANZ & SONS

Manufacturers of

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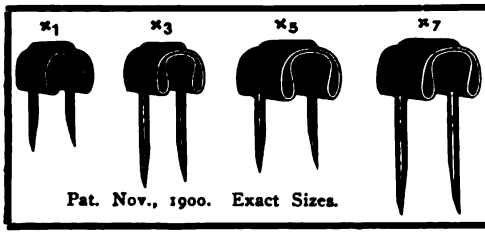
WE GALVANIZE BY THE HOT PROCESS

PITTSBURG, PA.

BRASS AND COPPER { TUBES ROD WIRE SHEET



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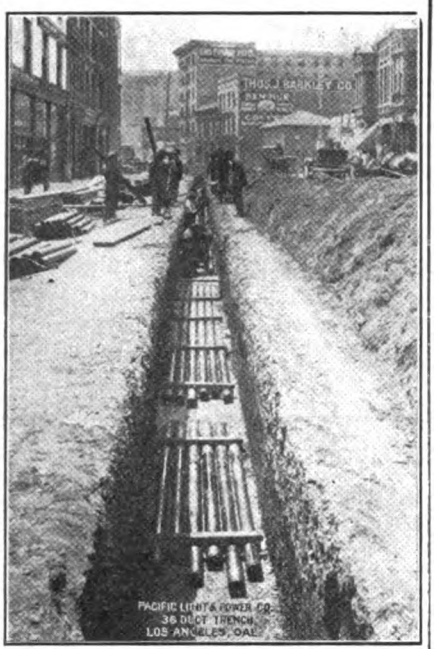

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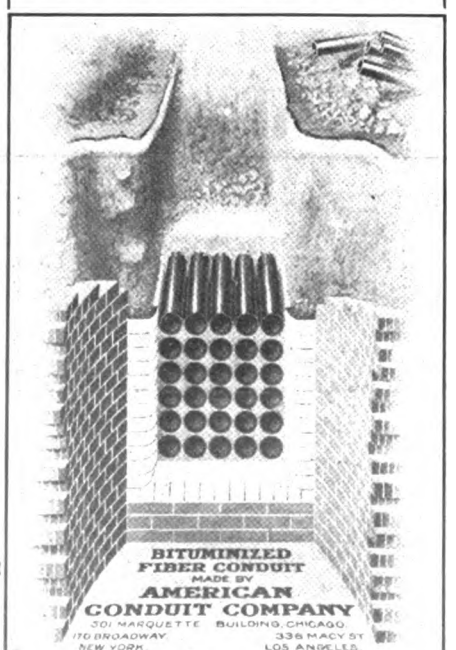

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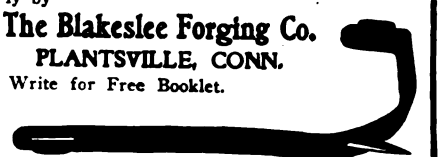

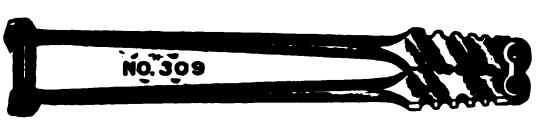

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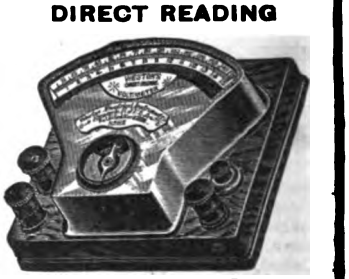

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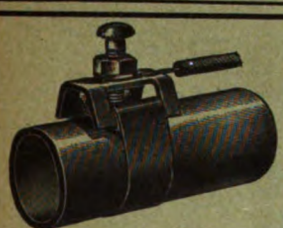

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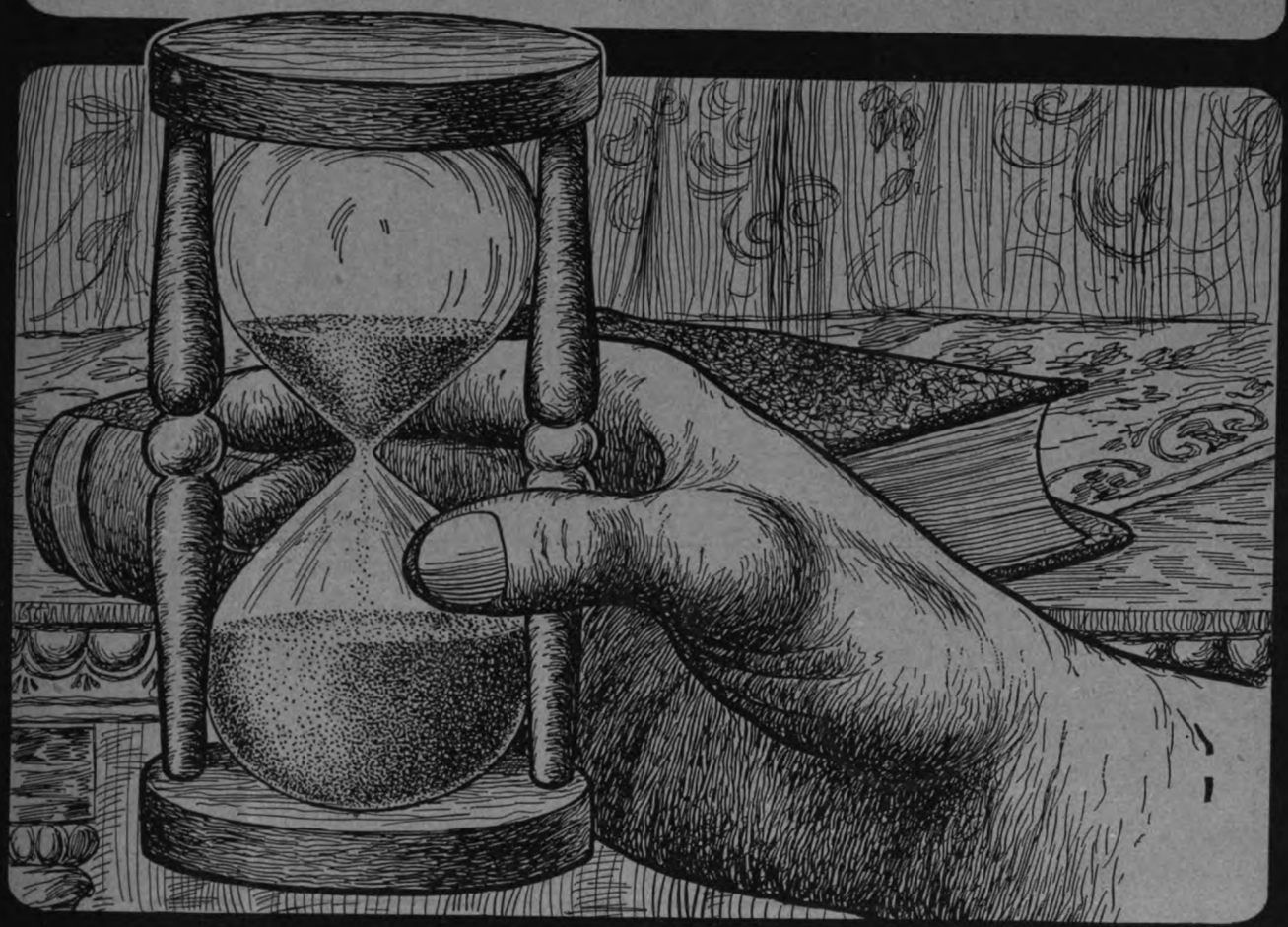

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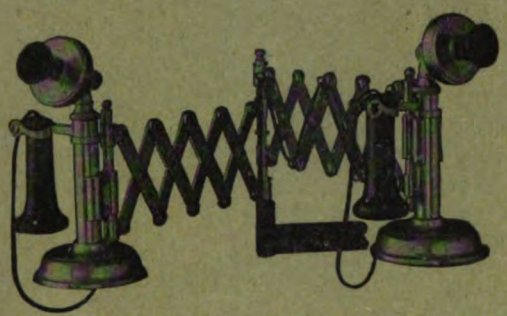

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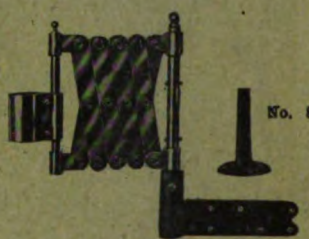

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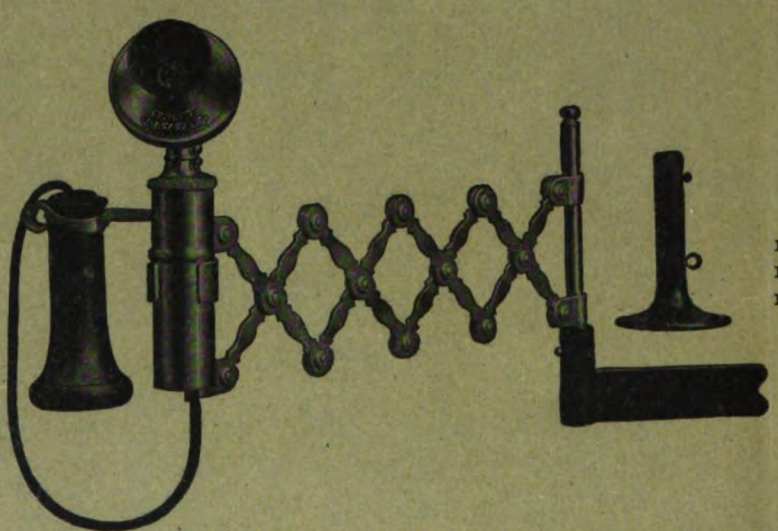

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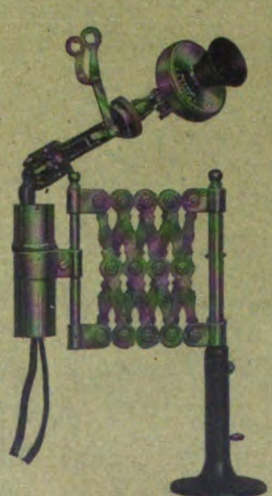

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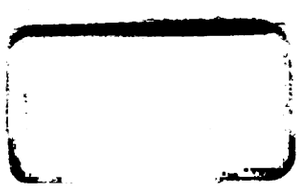

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